



**DEPARTMENT OF FORESTRY AND FIRE PROTECTION  
OFFICE OF THE STATE FIRE MARSHAL**

P.O. Box 944246  
SACRAMENTO, CA 94244-2460  
(916) 445-8200  
Website: [www.fire.ca.gov](http://www.fire.ca.gov)



## ATTACHMENT 5

**Date:** August 20, 2015

**To:** State Board of Fire Services

**From:** Mark Romer, Fire Service Training Specialist III

### **SUBJECT/AGENDA ACTION ITEM:**

Approval of 2015 Fire Apparatus Driver/Operator Certification Track and Curriculum

### **Recommended Actions:**

#### **(Discussion/Actions)**

Seeking SBFS approval of the new 2015 Fire Apparatus Driver/Operator Certification Track and curriculum, to include the Certification Training Standards, Course Plans, Task Books, and the Implementation Plan

### **Back Ground Information:**

The first Driver/Operator program was written in 1988. This program consisted of two courses Driver/Operator 1A (focused on inspecting and driving fire apparatus) and 1B (focused on pump operations). A person completing both courses and having the required experience could apply for Driver/Operator 1 certification.

In 2000, a cadre was formed to rewrite the two classes and incorporate the latest National Fire Protection Association (NFPA) standard (NFPA 1002, 1999 edition). The main focus of the rewrite was "pumping apparatus" only. The cadre developed all of the lesson plans, PowerPoints, written tests (including the certification/summative exams) skills test sheets, and a student supplement. The cadre of ten members completed their tasks within one year.

In 2011, the Los Angeles County Fire Department (LACFD) proposed to STEAC for approval, a course developed by the LACFD focused on Aerial/Tiller operation. To align with State Fire Trainings mission alignment, the Statewide Training and Education Advisory Committee (STEAC) moved to adopted the LACFD course and place it into the Fire Service Training and Education Program (FSTEP) track pending the review of NFPA standards and the development of a new certification training standard (CTS).

In September, 2014 a cadre was convened to review and develop the Driver/Operator certification track. The personnel were task with reviewing the 2014 edition of NFPA 1002 Standards for Fire Apparatus/Operator Professional Qualification and developing the new certification track, Certification Training Standards (CTS), Course plans, Activity Sheets and Skill sheets for later use in the certification testing process. The cadre provided a rewrite of 2 of the existing courses (Driver/Operator 1A &1B) and developed four new courses and levels of certification (see attachment layout of series and courses).

In December 2014, a validation cadre was brought together to review the new certification track and courses. During this meeting minor adjustments were made to the Certification Training Standards (CTSs) and Course Plans. With the adjustments agreed upon by members of the development committee, the program was validated.

**Analysis/Summary of Issue:**

The new Driver/Operator certification track will include the following classes.

The new certification track is as follows:

1. Certified Driver/Operator Pump
  - a) Driver/Operator 1A
  - b) Driver/Operator 1B
2. Certified Driver/Operator Aerial
3. Certified Driver/Operator Tiller
4. Certified Driver/Operator Wildland
5. Certified Driver/Operator Tender

## Driver / Operator Series

### Course Layout and Prerequisites

Certification Title	Fire Apparatus Driver/Operator Pump		Fire Apparatus Driver/Operator Aerial	Fire Apparatus Driver/Operator Tiller	Fire Apparatus Driver/Operator Wildland	Fire Apparatus Driver/Operator AARF	Fire Apparatus Driver/Operator Water Tender
Course Title	Driver/Operator 40 Hours	Pumping Apparatus Operations 40 Hours	Aerial Apparatus Operations 40 Hours	Tillered Apparatus Operations 40 Hours	Wildland Fire Apparatus Operations 24 Hours	N/A	Water Tender Operations 32 Hours
Course Prerequisites	Valid Class C DL	Firefighter 1 Training	Firefighter 1 Training	Firefighter 1 Training	Firefighter 1 Training	N/A	Firefighter 1 Training
		Driver/Operator	Driver/Operator	Driver/Operator	Driver/Operator	N/A	Driver/Operator
					Pumping Apparatus Operations	N/A	Pumping Apparatus Operations

# Fire Apparatus Driver/Operator – Pumping Apparatus

---



## Certification Training Standards Guide [Month 2015]



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

# Fire Apparatus Driver/Operator – Pumping Apparatus

## Certification Training Standards Guide [Month 2015]

This CTS guide utilizes NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014) to provide the qualifications for State Fire Training’s Fire Apparatus Driver/Operator – Pumping Apparatus certification.

State Fire Training coordinated the development of this CTS guide. Before its publication, the Statewide Training and Education Advisory Committee (STEAC) and the State Board of Fire Services (SBFS) recommended this CTS guide for adoption by the Office of the State Fire Marshal (OSFM).



Published by State Fire Training  
1131 S Street, Sacramento, CA 95811  
(916) 445-8200

Cover photo courtesy of Drew Oliphant, Los Angeles City Fire Department]

# Table of Contents

State Fire Training .....	1
Acknowledgments.....	2
How to Read a CTS Guide.....	5
Fire Apparatus Driver/Operator – Pumping Apparatus .....	7
Section 1: Preventive Maintenance .....	7
1-1: Perform Routine Tests, Inspections, and Servicing Functions .....	7
1-2: Document Routine Tests, Inspections, and Servicing Functions .....	8
1-3: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Pumping Apparatus.....	9
Section 2: Driving/Operating .....	10
2-1: Operate a Fire Apparatus .....	10
2-2: Back a Fire Apparatus from a Roadway into Restricted Spaces.....	12
2-3: Maneuver a Fire Apparatus around Obstructions on a roadway While Moving Forward and in Reverse .....	13
2-4: Turn a Fire Apparatus 180 Degrees within a Confined Space.....	14
2-5: Maneuver a Fire Apparatus in Areas with Restricted Horizontal and Vertical Clearances.....	15
2-6: Operate a Fire Apparatus Using Defensive Driving Techniques.....	16
2-7: Operate All Fixed Systems and Equipment on a Fire Apparatus.....	17
2-8: Produce an Effective Hand or Master Stream.....	18
2-9: Relay Pumping Operation .....	19
2-10: Produce a Foam Fire Stream.....	20
2-11: Supply Water to Fire Sprinkler and Standpipe Systems.....	21
State Fire Training Content.....	22

# State Fire Training

## Mission

To enable the California Fire Service to safely protect life and property through education, training, and certification.

## The California Fire Services 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.

CFSTES facilitates, coordinates, and assists in the development and implementation of standards and certification for the California fire service. CFSTES:

- Administers the California Fire Academy System

- Provides accredited courses leading to certification and approved standardized training programs for local and regional delivery

- Administers the national accreditation process in California

- Publishes certification training standards, course plans, and a certification task book for each certified level in the California fire service

CFSTES is a fire service system developed by the fire service, for the fire service. It is only as successful and effective as the people involved in it.

## Acknowledgments

State Fire Training appreciates the hard work and accomplishments of those who built the solid foundation on which this program continues to grow.

State Fire Training gratefully acknowledges the following individuals and organizations for their diligent efforts and contributions that made the development and publication of this document possible.

### CAL FIRE

**Ken Pimlott**  
*Director, CAL FIRE*

**Tonya Hoover**  
*State Fire Marshal*

**Mike Richwine**  
*Assistant State Fire Marshal*

**Vacant**  
*Chief, State Fire Training*

**Ron Coleman**  
*Chair, STEAC*

### Cadre Leadership

**Mark Romer**  
*Cadre Leader*  
*Fire Service Training Specialist III, Office of the State Fire Marshal*

**Alicia Hamilton**  
*Cadre Editor*  
*Sacramento State*

### Cadre Members

**Jonathan Black**  
*Captain, Santa Clara County Fire Department*  
*Development and Validation Cadre*

## Acknowledgments

---

**Bruce Fosdike**

*Captain, CAL FIRE (Retired), San Luis Obispo Unit  
Development Cadre*

**Daniel Hoy**

*Engineer, Sacramento Metropolitan Fire District  
Development Cadre*

**Timothy McIntyre**

*Engineer, Los Angeles County Fire Department  
Development and Validation Cadre*

**Drew Oliphant**

*Engineer, Los Angeles Fire Department  
Development and Validation Cadre*

**Ann Johnston Rosales**

*Battalion Chief, CAL FIRE/Fire Academy  
Development and Validation Cadre*

**Steve Walton**

*Engineer, Larkspur Fire Department  
Development Cadre*

**Karen Wilson**

*Lieutenant, Mariposa County Fire Department  
Development and Validation Cadre*

## Validation Members

**Craig Berchtold**

*Engineer, Livermore-Pleasanton Fire Department  
Validation Cadre*

**Bret Black**

*Captain, Clovis Fire Department  
Validation Cadre*

**Steve Castagnola**

*Engineer, San Bernardino County Fire Department  
Validation Cadre*

## Acknowledgments

---

**Boyd Clegg**

*Assistant Chief, Vacaville Fire Protection District  
Validation Cadre*

**Jim Colston**

*Captain, San Marcos Fire Department  
Validation Cadre*

**DeWayne Felkins**

*Captain, Sacramento Fire Department  
Validation Cadre*

**John Malone**

*Captain, Dixon Fire Department  
Validation Cadre*

**Kelly Tassone**

*Captain (Retired), Sacramento Metropolitan Fire District  
Validation Cadre*

**Tanisha Tucker**

*Engineer, Oakland Fire Department  
Validation Cadre*

## Partners

State Fire Training also extends special acknowledgement and appreciation to the Conference and Training Services Unit with the College of Continuing Education at California State University, Sacramento, for its ongoing meeting logistics and curriculum development support, innovative ideas, and forward-thinking services. This collaboration is made possible through an interagency agreement between CAL FIRE and Sacramento State.

## How to Read a CTS Guide

State Fire Training develops a Certification Training Standards (CTS) Guide for a variety of job functions in the fire service such as firefighter, driver/operator, fire instructor, and company officer. The CTS guide lists the requisite knowledge and skills and the job performance requirements a person is expected to complete in order to become certified in a specific function. CTS guides are appropriate for fire service personnel and individuals in related occupations pursuing State Fire Training certification.

Each CTS guide serves as a foundation for the certification programs recommended for adoption by the Office of the State Fire Marshal. Any certification program must be based on job-related knowledge and measurable performance standards. To master the knowledge and skills needed for specialized operations, individuals will require additional training to augment the performance standards included in the CTS guide.

Within the CTS guide, it is impossible to capture the different policies and procedures of each organization in the California fire service. Individuals aspiring to meet State Fire Training's certification training standards must do so in accordance with the codes, standards, regulations, policies, and standard operating procedures applicable within their own departments or jurisdictions.

### Format

Each certification training standard included in the CTS guide includes the following:

#### Section Heading

The section heading describes a general category for a group of training standards. For example, the Fire Marshal CTS includes the following sections: Administration, Risk Management, Community Relations, Professional Development, Regulatory Programs, Fire and Life Safety, and Investigation. Each section contains one or more individual training standards.

#### Training Standard Title

The training standard title provides a general description of the performance requirement contained within the standard.

#### Authority

The CTS guide references each standard with one or more paragraphs of the corresponding National Fire Protection Association (NFPA) Professional Qualifications. This ensures that each fire service function within California's certification system meets or exceeds NFPA standards.

When California requirements exceed the NFPA standard, the CTS guide cites the Office of the State Fire Marshal as the authority and prints the corresponding information in *italics*.

### **Given**

This section lists the objects, equipment, materials, or facilities an individual needs in order to acquire the requisite knowledge and skills or to accomplish the job performance requirement(s) within a training standard.

### **Requisite Knowledge and Skills**

This section lists the knowledge and skills that an individual must acquire in order to accomplish the job performance requirement(s) within a training standard.

This section does not include NFPA requisite knowledge or skills that are too general to teach or that individuals should develop through life experiences. For example, a training standard would not list “communicate orally and in writing” or “ability to relate interpersonally” unless they specifically apply to a job performance requirement about acquiring communication skills or developing interpersonal relationships.

### **Job Performance Requirements**

This section includes one or more written statements that describe a specific job-related task and define measurable or observable outcomes. After an individual completes all coursework and requisite requirements, the certification task book process verifies completion of job performance requirements.

## **Content**

In addition to the individual certification training standards, the CTS guide also includes State Fire Training Revisions and Errata pages.

### **State Fire Training Content**

Located at the back of the CTS guide, this table documents any significant revisions made by State Fire Training to the NFPA standards in the development of this CTS guide. This table is used to justify content additions and advise the course plan development team.

### **Errata**

Located at the back of the CTS guide, this page documents any changes made to the CTS guide outside of the five-year NFPA revision cycle.

# Fire Apparatus Driver/Operator – Pumping Apparatus

## Section 1: Preventive Maintenance

### 1-1: Perform Routine Tests, Inspections, and Servicing Functions

#### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 4.2.1

Office of the State Fire Marshal

#### Given

1. Fire *apparatus*
2. *Tools and equipment*
3. Manufacturer's specifications *and requirements*
4. Policies and procedures of the jurisdiction

#### Requisite Knowledge and Skills

1. *Recognize* manufacturer specifications and requirements
2. *Review* policies and procedures of the jurisdiction
3. *Describe* fire apparatus systems and components
4. Use tools *and equipment*
5. *Inspect* fire apparatus
6. Recognize system problems *and out-of-service criteria*
7. Correct any deficiency noted according to policies and procedures *and/or manufacturer specifications and requirements*

#### Job Performance Requirements

Perform routine tests, inspections, and servicing functions on the systems and components of a fire apparatus to verify operational status.

## **1-2: Document Routine Tests, Inspections, and Servicing Functions**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 4.2.2

### **Given**

1. Maintenance and inspection forms

### **Requisite Knowledge and Skills**

1. *Identify* jurisdictional requirements for documenting maintenance performed
2. *Describe* the importance of keeping accurate records
3. Complete related jurisdictional forms

### **Job Performance Requirements**

Document routine tests, inspections, and servicing functions by checking all items for proper operation and reporting any deficiencies.

### **1-3: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Pumping Apparatus**

#### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 5.1.1

Office of the State Fire Marshal

#### **Given**

1. Pumping *apparatus*
2. *Tools and equipment*
3. Manufacturer's specifications *and requirements*
4. Policies and procedures of the jurisdiction

#### **Requisite Knowledge and Skills**

1. *Recognize* manufacturer specifications and requirements
2. *Review* policies and procedures of the jurisdiction, *including documentation requirements*
3. *Describe* pumping systems and components
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 policies and procedures *and/or manufacturer specifications and requirements*

#### **Job Performance Requirements**

Perform and document routine tests, inspections, and servicing functions on the systems and components of a pumping apparatus to verify their operational status.

## Section 2: Driving/Operating

### 2-1: Operate a Fire Apparatus

#### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraphs 4.3.1 and 4.3.6

Office of the State Fire Marshal

#### Given

1. *Fire apparatus*
2. *Applicable state and local laws*
3. *Policies and procedures of the jurisdiction*
4. A predetermined route on a public way that incorporates the maneuvers and features that the driver/operator is expected to encounter during normal operations

#### Requisite Knowledge and Skills

1. *Describe the importance of wearing passenger restraint devices to ensure crew safety*
2. *Identify the common causes of fire apparatus accidents*
3. *Recognize that fire apparatus drivers/operators are responsible for the safe and prudent operation of the apparatus under all conditions*
4. *Discuss proper positioning of a fire apparatus*
5. *Explain the effects of liquid surge, braking reaction time, and load factors*
6. *Explain the effects of high center of gravity on roll-over potential, general steering reactions, speed, and centrifugal force*
7. *Describe applicable laws and regulations*
8. *Review policies and procedures of the jurisdiction*
9. *Explain the principles of skid avoidance, night driving, shifting, and gear patterns*
10. *Explain negotiating intersections, railroad crossings, and bridges*
11. *Describe the weight and height limitations for both roads and bridges*
12. *Discuss automatic braking systems in wet and dry conditions*
13. *Identify automotive gauges and their operation*
14. *Discuss the operational limits of the various types of fire apparatus*
15. Operate passenger restraint devices
16. Maintain safe following distances
17. Maintain control of the fire apparatus while accelerating, decelerating, and turning, given road, weather, and traffic conditions
18. Operate under adverse environmental or driving surface conditions
19. Use automotive gauges and controls

**Job Performance Requirements**

Operate a fire apparatus following a predetermined route on a public way in compliance with all applicable state and local laws and policies and procedures of the jurisdiction.

## **2-2: Back a Fire Apparatus from a Roadway into a Restricted Space**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 4.3.2

### **Given**

1. Fire apparatus
2. Spotter
3. A restricted space requiring 90-degree right- and left-hand turns from the roadway (12 feet wide)

### **Requisite Knowledge and Skills**

1. *Identify* fire apparatus dimensions
2. *Describe* turning characteristics
3. *Discuss* spotter signaling
4. *Explain* principles of safe fire apparatus operation *during this exercise*
5. Use mirrors *to* judge fire apparatus clearance

### **Job Performance Requirements**

Back a fire apparatus from a roadway and park into a space with restrictions on both the right and left sides of the apparatus without stopping, pulling forward, and without striking any obstructions.

## **2-3: Maneuver a Fire Apparatus around Obstructions on a Roadway While Moving Forward and in Reverse**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 4.3.3

### **Given**

1. Fire apparatus
2. Spotter
3. A roadway with obstructions

### **Requisite Knowledge and Skills**

1. *Identify* fire apparatus dimensions
2. *Explain* principles of safe fire apparatus operation *during this exercise*
3. Use mirrors to judge fire apparatus clearance

### **Job Performance Requirements**

Maneuver a fire apparatus around obstructions on a roadway while moving forward and in reverse without stopping to change the direction of travel and without striking any obstructions.

## **2-4: Turn a Fire Apparatus 180 Degrees within a Confined Space**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 4.3.4

### **Given**

1. Fire apparatus
2. Spotter
3. An area in which the fire apparatus cannot perform a U-turn without stopping and backing up

### **Requisite Knowledge and Skills**

1. *Explain* principles of safe fire apparatus operation *during this exercise*
2. Use mirrors to judge fire apparatus clearance

### **Job Performance Requirements**

Turn a fire apparatus 180 degrees within a confined space without striking any obstructions.

## **2-5: Maneuver a Fire Apparatus in Areas with Restricted Horizontal and Vertical Clearances**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 4.3.5

### **Given**

1. Fire apparatus
2. A course with restricted horizontal and vertical clearances

### **Requisite Knowledge and Skills**

1. *Identify* fire apparatus dimensions
2. *Explain* principles of safe fire apparatus operation *during this exercise*
3. Use mirrors to judge fire apparatus clearance

### **Job Performance Requirements**

Maneuver a fire apparatus in areas with restricted horizontal and vertical clearances and accurately judge the ability of the apparatus to pass through the openings without striking any obstructions.

## **2-6: Operate a Fire Apparatus Using Defensive Driving Techniques**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 4.3.6

Office of the State Fire Marshal

### **Given**

1. Fire apparatus
2. Applicable laws and regulations
3. *Policies and procedures of the jurisdiction*
4. An assignment

### **Requisite Knowledge and Skills**

1. *Describe applicable laws and regulations related to emergency response*
2. *Review policies and procedures of the jurisdiction related to emergency response*
3. *Discuss defensive driving techniques for emergency and nonemergency response*

### **Job Performance Requirements**

Operate a fire apparatus during emergency and nonemergency responses using defensive driving techniques while maintaining control of the apparatus.

## **2-7: Operate All Fixed Systems and Equipment on a Fire Apparatus**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 4.3.7

Office of the State Fire Marshal

### **Given**

1. *Fixed* systems and equipment
2. Manufacturer's specifications and *requirements*
3. Policies and procedures for the jurisdiction

### **Requisite Knowledge and Skills**

1. *Identify fixed systems and equipment on a fire apparatus*
2. *Recognize* manufacturer's specifications and *requirements*
3. *Review* policies and procedures of the jurisdiction
4. Deploy, energize, and monitor the system or equipment
5. Recognize and correct *any deficiency according to policies and procedures and/or manufacturer specifications and requirements*

### **Job Performance Requirements**

Operate all fixed systems and equipment on a fire apparatus not specifically addressed elsewhere in this standard in accordance with the applicable instructions and policies.

## 2-8: Produce an Effective Hand or Master Stream

### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 5.2.1

Office of the State Fire Marshal

### Given

1. Internal *water* tank
2. Pressurized *water* source
3. Static *water* source

### Requisite Knowledge and Skills

1. *Explain* hydraulic calculations for friction loss and flow using both written formulas and estimation methods
2. *Explain pump discharge pressure calculations*
3. *Describe the safe operation of the pump*
4. *Identify the problems related to small-diameter or dead-end mains*
5. *Discuss* low-pressure and private water supply systems
6. *Recognize* hydrant coding systems
7. *Discuss the* reliability of static sources
8. *Discuss proper positioning of a pumping apparatus*
9. *Describe the principles of drafting*
10. Position a pumping apparatus to operate at a fire hydrant and at a static water source
11. Power transfer from apparatus engine to pump
12. Draft
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 produce an effective stream*

### Job Performance Requirements

Produce an effective hand or master stream by engaging the pump, setting all pressure control and apparatus safety devices, achieving and maintaining the rated flow of the nozzle, while continuously monitoring the apparatus for potential problems.

## 2-9: Relay Pumping Operation

### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 5.2.2

Office of the State Fire Marshal

### Given

1. *Pumping apparatus (2 or more)*
2. *Water source*
3. *2½" or larger supply line*
4. *Relay pumping evolution*

### Requisite Knowledge and Skills

1. *Explain the need for relay pumping operations*
2. *Explain hydraulic calculations for friction loss and flow using both written formulas and estimation methods*
3. *Explain pump discharge pressure calculations*
4. *Position a pumping apparatus to operate at a fire hydrant and a static water source*
5. *Power transfer from apparatus engine to pump*
6. *Draft*
7. *Operate pumper pressure control systems*
8. *Operate the volume/pressure transfer valve (multistage pumps only)*
9. *Operate auxiliary cooling systems*
10. *Make the transition between internal and external water sources*
11. *Assemble hose lines, nozzles, valves, and appliances*
12. *Apply hydraulic calculations to a relay operation*

### Job Performance Requirements

Pump a 2½" or larger supply line to provide the correct pressure and flow to the next pumping apparatus in the relay.

## **2-10: Produce a Foam Fire Stream**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 5.2.3

Office of the State Fire Marshal

### **Given**

1. *Pumping apparatus*
2. *Foam-producing equipment*
3. *Foam concentrate*
4. *Manufacturer's specifications and requirements*

### **Requisite Knowledge and Skills**

1. *Describe* proportioning rates and concentrations
2. *Explain* equipment *and* assembly procedures
3. *Identify* foam system limitations
4. *Discuss* manufacturer's specifications *and* requirements
5. Operate foam proportioning equipment
6. Connect foam stream equipment

### **Job Performance Requirements**

Produce a foam fire stream to provide properly proportioned foam.

## 2-11: Supply Water to Fire Sprinkler and Standpipe Systems

### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 5.2.4

Office of the State Fire Marshal

### Given

1. Pumping apparatus
2. *Sprinkler and standpipe systems*
3. Specific system information

### Requisite Knowledge and Skills

1. *Explain hydraulic calculations for friction loss and flow using both written formulas and estimation methods*
2. *Explain pump discharge pressure calculations*
3. *Discuss hose layouts*
4. *Identify the location of fire department connections*
5. *Discuss 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. *Explain 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. *Position a pumping apparatus to operate at a fire hydrant*
10. *Power transfer from pumping apparatus engine to pump*
11. *Operate pumper pressure control systems*
12. *Operate the volume/pressure transfer valve (multistage pumps only)*
13. *Operate auxiliary cooling systems*
14. *Make the transition between internal and external water sources*
15. *Assemble hose lines, nozzles, valves, and appliances*
16. *Apply hydraulic calculations to a sprinkler and standpipe systems*

### Job Performance Requirements

Supply water to fire sprinkler and standpipe systems at the correct volume and pressure.

## State Fire Training Content

**Code Key**

**Blocks**

- G = Given
- RKS = Requisite Knowledge and Skills
- JPR = Job Performance Requirements
- NCTS = New certification training standard

**Sources**

- [ACRONYM = Title]
- [ACRONYM = Title]
- [ACRONYM = Title]

### Certification: Fire Apparatus Driver/Operator – Pumping Apparatus

CTS	Block	Addition	Justification	Source/Reference
1-1	G	Tools and equipment		
1-1	RKS	Describe fire apparatus systems and components		
1-1	RKS	Inspect fire apparatus		
1-3	G	Tools and equipment		
1-3	RKS	Describe pumping systems and components		
1-3	RKS	Inspect fire pump and components		
2-1	G	Fire apparatus		
2-1	G	Applicable state and local laws		
2-1	G	Policies and procedures of the jurisdiction		
2-1	RKS	Review policies and procedures of the jurisdiction		
2-6	G	Policies and procedures of the jurisdiction		
2-6	RKS	Review policies and procedures of the jurisdiction related to emergency response		

## Errata

CTS	Block	Addition	Justification	Source/Reference
2-6	RKS	Discuss defensive driving techniques for emergency and nonemergency response		
2-7	RKS	Identify fixed systems and equipment on a fire apparatus		
2-8	RKS	Explain pump discharge pressure calculations		
2-8	RKS	Discuss proper positioning of a pumping apparatus		
2-8	RKS	Describe the principles of drafting		
2-8	RKS	Apply hydraulic calculations to produce an effective stream		
2-9	G	Pumping apparatus (2 or more)		
2-9	G	Water source		
2-9	G	2½" or larger supply line		
2-9	RKS	Explain the need for relay pumping operations		
2-9	RKS	Explain pump discharge pressure calculations		
2-9	RKS	Apply hydraulic calculations to a relay operation		
2-10	G	Pumping apparatus		
2-10	G	Foam concentrate		
2-10	G	Manufacturer's specifications and requirements		
2-11	G	Sprinkler and standpipe systems		
2-11	RKS	Explain hydraulic calculations for friction loss and flow using both written formulas and estimation methods		
2-11	RKS	Apply hydraulic calculations to a sprinkler and standpipe systems		



# Driver/Operator

## Course Plan

### Course Details

- Certification:** Fire Apparatus Driver/Operator – Pumping Apparatus
- CTS Guide:** Fire Apparatus Driver/Operator – Pumping Apparatus (Month 2015)
- Description:** This course provides information on fire apparatus preventive maintenance and driving/operating. Topics include routine tests, inspections, and servicing functions, operate, back, maneuver, and turn a fire apparatus in a variety of conditions; and operate all fixed systems and equipment on a fire apparatus. This course is based on the 2014 edition of *NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications*. This course fulfills the requirements for a Class C Firefighter Endorsement.
- Designed For:** Career and volunteer fire service personnel who drive and operate fire apparatus
- Prerequisites:** Successfully completed OSFM Fire Fighter I training  
Hold a valid Class C driver's license (minimum)
- Standard:** Complete all activities and skills  
Complete the summative test with a minimum score of 80%
- Hours:**
- |             |       |
|-------------|-------|
| Lecture:    | 17:30 |
| Activities: | 3:30  |
| Skills:     | 17:00 |
| Testing:    | 2:00  |
- Hours (Total):** 40:00
- Maximum Class Size:** 30
- Instructor Level:** This courses requires one (1) primary instructor and sufficient assistant instructors to meet the skills ratio
- Instructor/Student Ratio:** Lecture: 1:30 Skills: 1:10

# Fire Apparatus Driver/Operator 1A

---

**Restrictions:** Sufficient fire apparatus and adequate space to accommodate the students in the class and the required skills

**SFT Designation:** CFSTES

## Required Resources

### Instructor Resources

To teach this course, instructors need:

- *Fire Apparatus Driver/Operator*, Second Edition, Jones & Bartlett, ISBN-13: 978-1-284-02691-7
- *or*
- *Aerial Apparatus Driver/Operator Handbook*, Third Edition, IFSTA, ISBN-13: 9780134027234
- Maintenance and inspection forms
- Manufacturer's specifications and requirements
- Applicable state and local laws

### Online Instructor Resources

The following instructor resources are available online at <http://osfm.fire.ca.gov/training/instructorscorner.php>:

- Fire Apparatus Driver/Operator 1A: Driver Operator required activities

### Student Resources

To participate in this course, students need:

- *Fire Apparatus Driver/Operator*, Second Edition, Jones & Bartlett, ISBN-13: 978-1-284-02691-7
- *or*
- *Aerial Apparatus Driver/Operator Handbook*, Third Edition, IFSTA, ISBN-13: 9780134027234
- Personal protective clothing

### 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 fire apparatus to accommodate the students in the class

## Fire Apparatus Driver/Operator 1A

---

- Tools and equipment for inspection and testing
- Tape measure
- Traffic cones
- Delineators
- Left front tire marker
- Optional straight line marker
- Vertical obstacle
- Spotters
- Personal protective clothing
- Adequate space to accommodate the required skills

DRAFT

## 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, 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
  - Required student resources
  - Class participation requirements

#### Discussion Questions

1. What is a formative test? What is a summative test?

#### Activities

1. To be determined by the instructor.

### Topic 1-2: Fire Apparatus Driver/Operator – Pumping Apparatus Certification Process

#### Terminal Learning Objective

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

## Fire Apparatus Driver/Operator 1A

---

### Enabling Learning Objectives

1. Identify the courses required for Fire Apparatus Driver/Operator – Pumping Apparatus certification
  - Fire Apparatus Driver/Operator 1A: Driver/Operator
  - Fire Apparatus Driver/Operator 1B: Pumping Apparatus Operations
2. Identify any other requirements for Fire Apparatus Driver/Operator – Pumping Apparatus certification
  - OSFM certified Fire Fighter I
  - Experience [one (1) of the following two (2) options]
    - Option 1: Have a minimum of one (1) year full-time, paid experience in a California fire department with the primary responsibility as a pumping apparatus driver/operator
    - Option 2: Have a minimum of two (2) years volunteer or part-time, paid experience in a California fire department with the primary responsibility as a pumping apparatus driver/operator
  - Be appointed to the rank or position of Fire Apparatus Driver/Operator
    - Performing in an acting capacity does not qualify
3. Describe the certification task book process
  - Complete all prerequisites and course work
  - Submit application and fees to request certification task book
  - Complete all job performance requirements included in the task book
  - Must have identified evaluator verify individual task completion via signature
  - Must have Fire Chief or authorized representative verify task book completion via signature
  - Must be employed by a California Fire Agency in the position prior to submitting completed task book to State Fire Training
4. Describe the certification testing process
  - Complete course work
  - Schedule online certification test
  - Schedule skills evaluation test

### Discussion Questions

1. What is the experience required for certification?

### Activities

1. To be determined by the instructor.

## Unit 2: Preventive Maintenance

### Topic 2-1: Perform Routine Tests, Inspections, and Servicing Functions

#### Terminal Learning Objective

At the end of this topic, a student, given a fire apparatus, tools and equipment, manufacturer's specifications and requirements, and policies and procedures of the

jurisdiction, will be able to perform routine tests, inspections, and servicing functions on the systems and components of a fire apparatus to verify their operational status.

### Enabling Learning Objectives

1. Recognize manufacturer specifications and requirements
2. Review policies and procedures of the jurisdiction
3. Describe fire apparatus systems and components
  - Braking system
  - Coolant system
  - Electrical system
  - Exhaust system
  - Fuel systems
  - Steering and suspension systems
  - Batteries
  - Belts
  - Body, frame, and cab
  - Fluids
  - Lighting
  - Oil and lubrication
  - Tires
  - Tools, appliances, and equipment
4. Use tools and equipment
5. Inspect fire apparatus
6. Recognize system problems and out-of-service criteria
7. Correct any deficiency noted according to policies and procedures and/or manufacturer specifications and requirements

### Discussion Questions

1. What recent changes have occurred to diesel exhaust technology?
2. Why do we inspect our fire apparatus?
3. Describe a situation where you were involved and the fire apparatus mechanically failed. Why did this failure occur?
4. What is your jurisdiction's fire apparatus inspection procedure?

### Activities

1. Divide students into small groups. Have each group perform a fire apparatus inspection using a form provided by the instructor. They will present their findings after the activity in Topic 2-2.

**CTS Guide Reference:** CTS 1-1

## Topic 2-2: Document Routine Tests, Inspections, and Servicing Functions

### Terminal Learning Objective

At the end of this topic, a student, given maintenance and inspection forms, will be able to document routine tests, inspections, and servicing functions by checking all items for proper operation and reporting any deficiencies.

### Enabling Learning Objectives

1. Identify jurisdictional requirements for documenting maintenance performed
2. Describe the importance of keeping accurate records
3. Complete related jurisdictional forms

### Discussion Questions

1. What are your jurisdiction's requirements for documenting maintenance performed or requesting repairs?
2. What intervals does your jurisdiction require you to document your inspection?
3. What are the consequences of falsifying inspection documents?

### Activities

1. Have each group document their fire apparatus inspection using a form provided by the instructor and present their findings.

### Instructor Notes

1. Topics 2-1 and 2-2 can be taught concurrently.

**CTS Guide Reference:** CTS 1-2

## Unit 3: Driving/Operating

### Topic 3-1: Operate a Fire Apparatus

#### Terminal Learning Objective

At the end of this topic, a student, given fire apparatus, applicable state and local laws, policies and procedures of the jurisdiction, and a predetermined route on a public way that incorporates the maneuvers and features that the driver/operator is expected to encounter during normal operations, will be able to operate a fire apparatus following a predetermined route on a public way in compliance with all applicable state and local laws and policies and procedures of the jurisdiction.

#### Enabling Learning Objectives

1. Describe the importance of wearing passenger restraint devices to ensure crew safety
2. Identify common causes of fire apparatus accidents
3. Recognize that fire apparatus drivers/operators are responsible for the safe and prudent operation of the apparatus under all conditions
4. Discuss proper positioning of a fire apparatus
5. Explain the effects of liquid surge, braking reaction time, and load factors
6. Explain the effects of high center of gravity on roll-over potential, general steering reactions, speed, and centrifugal force
7. Describe applicable laws and regulations
  - Driver's license requirements
  - Medical requirements
8. Review policies and procedures of the jurisdiction
9. Explain the principles of skid avoidance, night driving, shifting, and gear patterns
10. Explain negotiating intersections, railroad crossings, and bridges
11. Describe the weight and height limitations for both roads and bridges

## Fire Apparatus Driver/Operator 1A

---

12. Discuss automatic braking systems in wet and dry conditions
13. Identify automotive gauges and their operation
14. Discuss the operational limits of the various types of fire apparatus
15. Operate passenger restraint devices
16. Maintain safe following distances
17. Maintain control of the fire apparatus while accelerating, decelerating, and turning, given road, weather, and traffic conditions
18. Operate under adverse environmental or driving surface conditions
19. Use automotive gauges and controls

### Discussion Questions

1. Who is responsible for ensuring passenger restraint devices are worn? What is the potential liability and emotional stress?
2. What would you consider when driving an apparatus in inclement weather?
3. Does your jurisdiction have any specific operational limits?
4. How is driving a fire apparatus different than driving your personal vehicle?
5. How would you position a fire apparatus at a \_\_\_\_\_?

### Activities

1. Divide students into small groups. Have each group review a fire apparatus accident and develop recommendations for preventing a reoccurrence? Have each group present their findings.

**CTS Guide Reference:** CTS 2-1

## Topic 3-2: Operate a Fire Apparatus Using Defensive Driving Techniques

### Terminal Learning Objective

At the end of this topic, a student, given a fire apparatus, applicable laws and regulations, policies and procedures of the jurisdiction, and an assignment, will be able to operate a fire apparatus during emergency and nonemergency responses using defensive driving techniques while maintaining control of the apparatus.

### Enabling Learning Objectives

1. Review policies and procedures of the jurisdiction related to emergency response
2. Describe applicable laws and regulations related to emergency response
  - California Vehicle Code
  - Local jurisdictional requirements
3. Discuss defensive driving techniques for emergency and nonemergency response

### Discussion Questions

1. What is jurisdiction's policy on Code 3 driving?
2. What are some considerations when approaching an intersection?

### Activities

1. Divide students into small groups. Give each group a topic and have them identify the applicable California Vehicle Code (CVC) section and prepare a brief summary highlighting its important points. Have each group present their findings.

### Instructor Notes

1. Topics 3-1 and 3-2 can be taught concurrently.

**CTS Guide Reference:** CTS 2-6

## Topic 3-3: Back a Fire Apparatus from a Roadway into a Restricted Space

### Terminal Learning Objective

At the end of this topic, a student, given a fire apparatus, spotter, and a restricted spaces requiring 90-degree right- and left-hand turns from the roadway (12 feet wide), will be able to back a fire apparatus from a roadway and park into a space with restrictions on both the right and left sides of the apparatus without stopping, pulling forward, and without striking any obstructions.

### Enabling Learning Objectives

1. Identify fire apparatus dimensions
2. Describe turning characteristics
3. Discuss spotter signaling
4. Explain principles of safe fire apparatus operation during exercise
5. Use mirrors to judge fire apparatus clearance

### Discussion Questions

1. What type of communication do you need with your spotter?
2. What are the dangers of backing your fire apparatus?

### Activities

1. Activity 3-3-1: Alley Dock or Activity 3-3-2: Station Parking

**CTS Guide Reference:** CTS 2-2

## Topic 3-4: Maneuver a Vehicle around Obstructions on a Roadway While Moving Forward and in Reverse

### Terminal Learning Objective

At the end of this topic, a student, given a fire apparatus, spotter, and a roadway with obstructions, will be able to maneuver a fire apparatus around obstructions on a roadway while moving forward and in reverse without stopping to change the direction of travel and without striking any obstructions.

### Enabling Learning Objectives

1. Identify fire apparatus dimensions
2. Explain principles of safe fire apparatus operation during this exercise
2. Use mirrors to judge fire apparatus clearance

### Discussion Questions

1. How do you determine the pivot point of your fire apparatus?
2. How is liquid surge going to affect apparatus control?

### Activities

1. Activity 3-4-1: Serpentine

**CTS Guide Reference:** CTS 2-3

### Topic 3-5: Turn a Fire Apparatus 180 Degrees within a Confined Space

#### Terminal Learning Objective

At the end of this topic, a student, given a fire apparatus, spotter, and an area in which the fire apparatus cannot perform a U-turn without stopping and backing up, will be able to turn a fire apparatus 180 degrees within a confined space without striking any obstructions.

#### Enabling Learning Objectives

1. Explain principles of safe fire apparatus operation during this exercise
2. Use mirrors to judge fire apparatus clearance

### Activities

1. Activity 3-5-1: Confined Space Turnaround

**CTS Guide Reference:** CTS 2-4

### Topic 3-6: Maneuver a Fire Apparatus in Areas with Restricted Horizontal and Vertical Clearances

#### Terminal Learning Objective

At the end of this topic, a student, given a fire apparatus and a course with restricted horizontal and vertical clearances will be able to maneuver a fire apparatus in areas with restricted horizontal and vertical clearances and accurately judge the ability of the apparatus to pass through the openings without striking any obstructions

#### Enabling Learning Objectives

1. Identify fire apparatus dimensions
2. Explain principles of safe fire apparatus operation during this exercise
3. Use mirrors to judge fire apparatus clearance

#### Discussion Questions

1. Where do you find the height of a fire apparatus?
2. Why is the height important?

### Activities

1. Activity 3-6-1: Diminishing Clearance

**CTS Guide Reference:** CTS 2-5

### Topic 3-7: Operate All Fixed Systems and Equipment on a Fire Apparatus

#### Terminal Learning Objective

At the end of this topic, a student, given fixed systems and equipment, manufacturer's specifications and requirements, and policies and procedures for the jurisdiction will be able to operate all fixed systems and equipment on a fire apparatus not specifically addressed elsewhere in this standard in accordance with the applicable instructions and policies.

### Enabling Learning Objectives

1. Identify fixed systems and equipment on a fire apparatus
  - Electric power generators
  - Scene lighting
  - Electrical power distribution equipment
  - Rescue tools
  - Other jurisdictional fixed systems or equipment
2. Recognize manufacturer's specifications and requirements
3. Review policies and procedures of the jurisdiction
4. Deploy, energize, and monitor the system or equipment
5. Recognize and correct any deficiency according to policies and procedures and/or manufacturer specifications and requirements

### Discussion Questions

1. What types of fixed systems and equipment do you have on your fire apparatus?
2. How often should fixed systems or equipment be inspected and to what detail?
3. In which order do you inspect your fixed systems?

### Activities

1. To be determined by the instructor.

**CTS Guide Reference:** CTS 2-7

## Fire Apparatus Driver/Operator 1A

### Time Table

Segment	Lecture Time	Activity/Skills Time	Total Unit Time
<b>Unit 1: Introduction</b>			
Topic 1-1: Orientation and Administration			
Lecture	0:30		
To be determined by instructor			
Topic 1-2: Fire Apparatus Driver/Operator Certification Process			
Lecture	0:30		
To be determined by instructor			
<b>Unit 1 Totals</b>	<b>1:00</b>	<b>0:00</b>	<b>1:00</b>
<b>Unit 2: Preventive Maintenance</b>			
Topic 2-1: Perform Routine Tests, Inspections, and Servicing Functions			
Lecture	5:00		
Recommended activity		1:00	
Topic 2-2: Document Routine Tests, Inspections, and Servicing Functions			
Lecture	0:30		
Recommended activity		0:30	
<b>Unit 2 Totals</b>	<b>5:30</b>	<b>1:30</b>	<b>7:00</b>
<b>Unit 3: Operating/Driving</b>			
Topic 3-1: Operate a Fire Apparatus			
Lecture	6:00		
Recommended activity		1:00	
Topic 3-2: Operate a Vehicle Using Defensive Driving Techniques			
Lecture	3:00		
Recommended activity		1:00	
Topic 3-3: Back a Vehicle from a Roadway into Restricted Spaces			
Lecture	0:15		
Activity 3-3-1: Alley Dock <i>or</i> Activity 3-3-2: Station Parking		*	
Topic 3-4: Maneuver a Vehicle around Obstructions on a roadway While Moving Forward and In Reverse			
Lecture	0:15		
Activity 3-4-1: Serpentine		*	

## Fire Apparatus Driver/Operator 1A

---

Segment	Lecture Time	Activity/Skills Time	Total Unit Time
Topic 3-5: Turn a Fire Apparatus 180 Degrees within a Confined Space			
Lecture	0:15		
Activity 3-5-1: Confined Space Turnaround		*	
Topic 3-6: Maneuver a Fire Apparatus in Areas with Restricted Horizontal and Vertical Clearances			
Lecture	0:15		
Activity: 3-6-1: Diminishing Clearance		*	
Topic 3-7: Operate All Fixed Systems and Equipment on a Fire Apparatus			
Lecture	1:00		
To be determined by the instructor			
<b>Unit 3 Totals</b>	<b>11:00</b>	<b>19:00</b>	<b>33:00</b>
<b>Lecture, Activity, and Unit Totals:</b>	<b>17:30</b>	<b>20:30</b>	<b>38:00</b>

### Course Totals

Total Lecture Time (LT)	17:30
Total Activity Time (AT)	3:30
Total Skills Time	*17:00
Total Testing Time (TT)	2:00
<b>Total Course Time</b>	<b>40:00</b>

Note: Skills time will vary depending on the number of students in the program. It is important to remember that the suggested skill hours are for 30 students.

## Driver/Operator

### Activity 3-3-1: Alley Dock

---

## Alley Dock

### Activity 3-3-1

**Format:** Individual

**Time Frame:** Open (based on a total of 16:00 hours for skills practice and completion)

#### Description

This activity provides students with an opportunity to measure a driver/operator's ability to drive past a simulated dock or stall, back the apparatus into the space provided, and stop smoothly.

#### Materials

- Fire apparatus
- Tape measure
- Traffic cones
- Delineators
- Extra traffic cones and delineators available

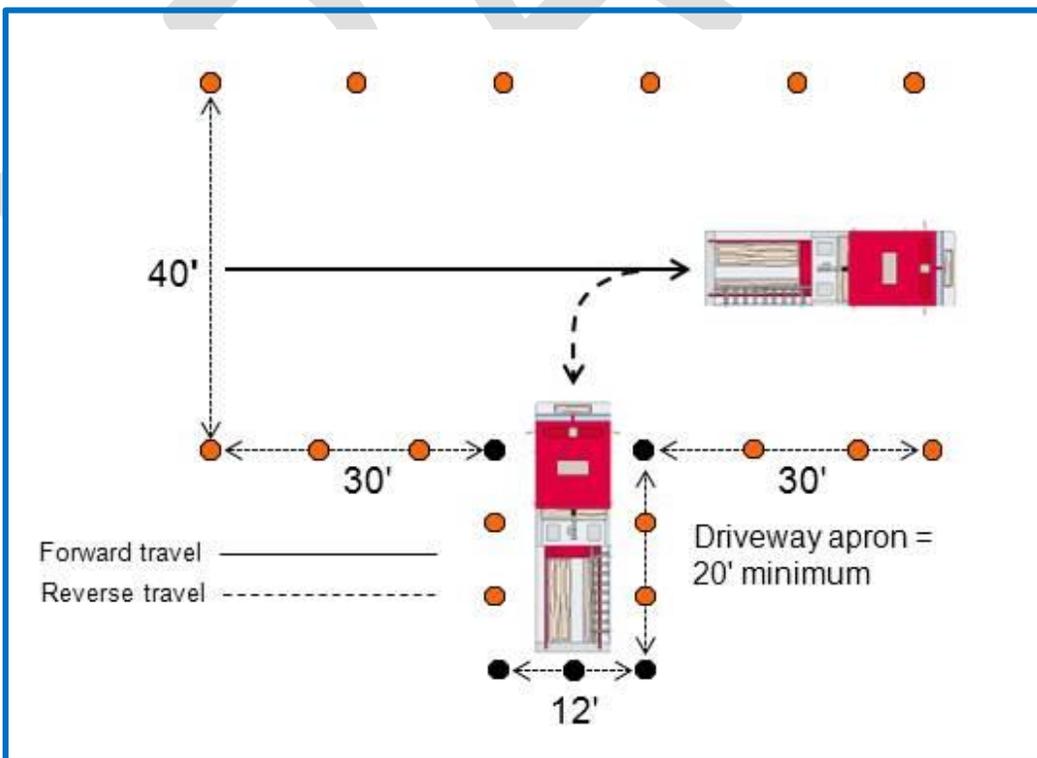
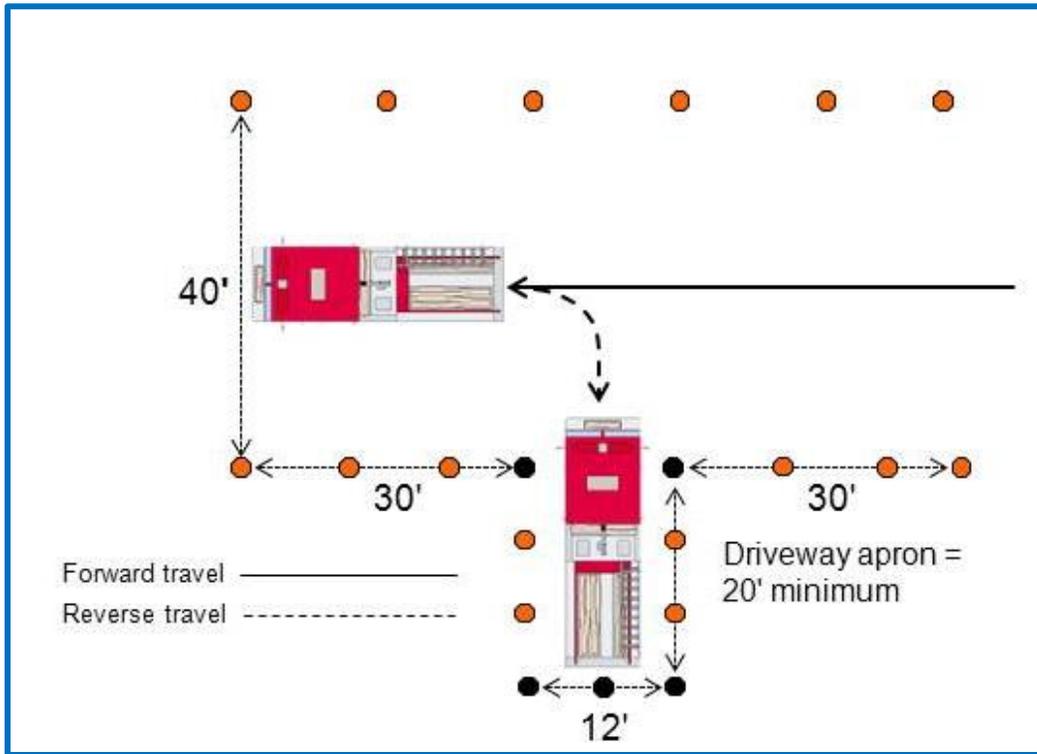
#### Instructions

1. Establish two boundary lines 40 feet apart and approximately 72 feet long using traffic cones.
2. Simulate a stall by arranging five (5) delineators off one boundary line, 12 feet apart, and approximately 20 feet long.
3. For larger apparatus, course measurements will need to be modified.
4. Place traffic cones on each side of the stall between the delineators.
5. The driver/operator passes the delineators with the stall on the left and then backs the apparatus, using a left turn, into the stall.
6. Repeat the exercise with the stall on the right side, using a right turn.

# Driver/Operator

## Activity 3-3-1: Alley Dock

### Activity Illustrations



## Driver/Operator

### Activity 3-3-2: Station Parking

---

## Station Parking

### Skill 3-3-2

**Format:** Individual

**Time Frame:** Open (based on a total of 16:00 hours for skills practice and completion)

### Description

This exercise measures the driver/operator's ability to back the apparatus into an apparatus bay.

### Materials

- Fire apparatus
- Tape measure
- Traffic cones
- Delineators
- Left front tire marker
- Optional straight line marker
- Extra traffic cones and delineators available

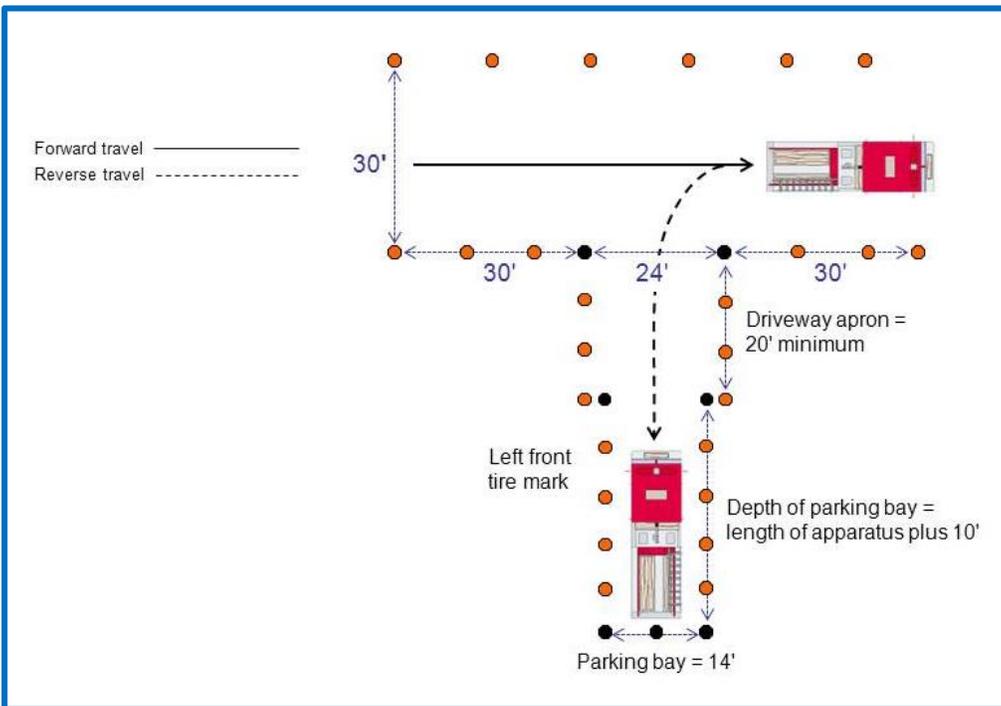
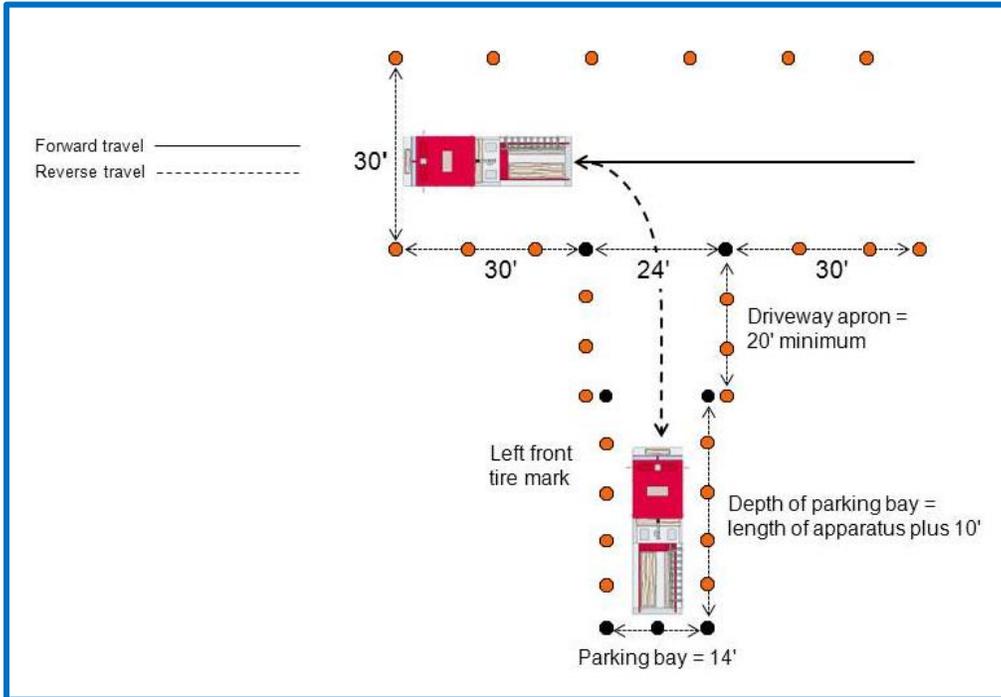
### Instructions

1. Establish two boundary lines 30 feet apart using traffic cones to simulate a street.
2. Simulate a driveway apron by arranging four (4) delineators off one boundary line, 24 feet wide, and a minimum of 20 feet long.
  - The instructor can increase the setback from the street based on the representative needs of the area.
3. Place traffic cones on each side of the driveway apron between the delineators.
4. Simulate the entrance to the apparatus bay by placing two (2) delineators 12 feet apart.
5. Place three (3) delineators at the back of the apparatus bay. This depth is determined by the length of the apparatus plus 10 feet.
6. Place traffic cones on each side of the apparatus bay between the delineators.
7. Place a marker on the ground to indicate to the driver/operator the proper position of the left front tire of the apparatus once stopped and parked.
8. An optional straight line can be placed on the floor of the apparatus bay to assist the driver/operator while backing the apparatus, facilitating the use of apparatus mirrors.
9. The driver/operator passes the delineators identifying the driveway apron on the left and then backs the apparatus, using a left turn, into the apparatus bay.
10. Repeat the exercise with the driveway apron on the right side, using a right turn.

# Driver/Operator

## Activity 3-3-2: Station Parking

### Activity Illustrations



## Driver/Operator

### Activity 3-4-1: Serpentine

---

## Serpentine

### Skill 3-4-1

**Format:** Individual

**Time Frame:** Open (based on a total of 16:00 hours for skills practice and completion)

### Description

This exercise measures a driver/operator's ability to steer the apparatus both forward and backward in close limits without stopping.

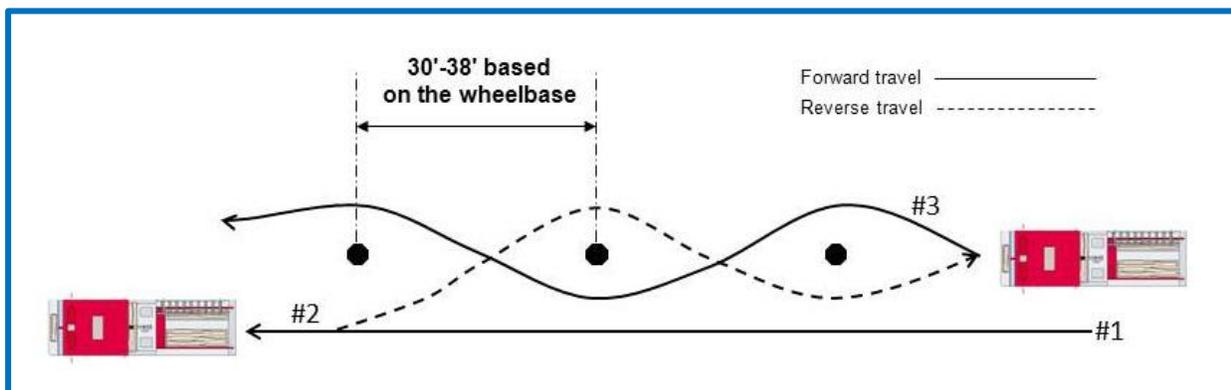
### Materials

- Fire apparatus
- Tape measure
- Three (3) delineators

### Instructions

1. Establish the course or path of travel for this exercise by placing a minimum of three delineators in a straight line.
  - The spacing of the delineators is based on double the wheelbase of the apparatus being used.
2. Provide adequate space on each side of the delineators for the apparatus to move freely.
3. The driver/operator drives the apparatus along the left side of the markers in a straight line and stops just beyond the last delineator.
4. The driver/operator then begins the exercise by backing the apparatus between the delineators by passing to the left of delineator #1, to the right of delineator #2, and to the left of delineator #3.
5. At this point, the driver stops the apparatus and then drives it forward between the delineators by passing to the right of delineator #3, to the left of delineator #2, and to the right of delineator #1.

### Activity Illustration



## Driver/Operator

### Activity 3-5-1: Confined Space Turnaround

---

## Confined Space Turnaround

### Skill 3-5-1

**Format:** Individual

**Time Frame:** Open (based on a total of 16:00 hours for skills practice and completion)

### Description

This exercise measures the driver/operator's ability to turn the apparatus around in a confined space without striking obstacles.

### Materials

- Fire apparatus
- Tape measure
- Traffic cones or paint
- Two (2) delineators

### Instructions

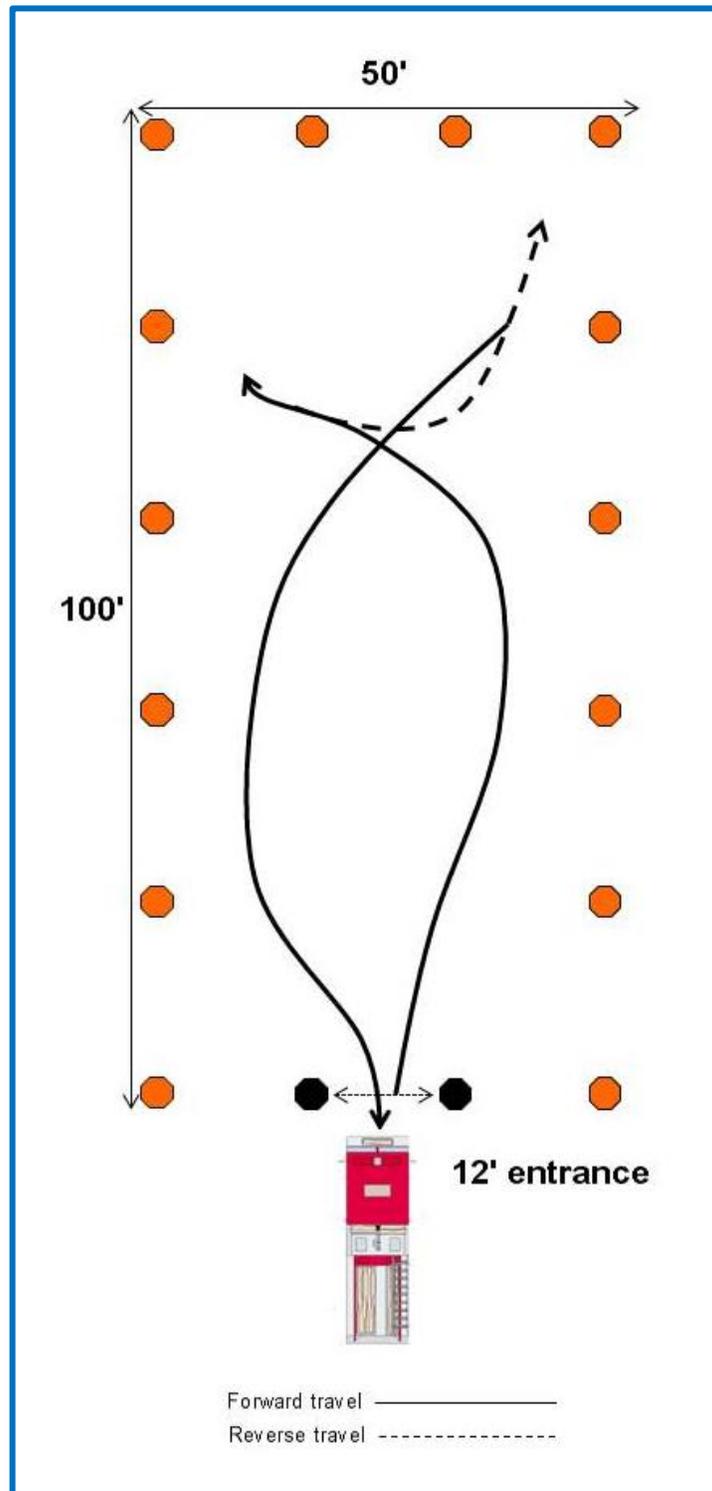
1. Establish an area 50 feet × 100 feet by painting lines on the ground or using traffic cones.
2. For larger apparatus, course measurements will need to be modified.
3. Establish an opening by placing two (2) delineators 12 feet apart in the center of one of the 50-foot legs.
4. The driver/operator drives into the area through the 12-foot opening, turns the apparatus 180 degrees, and returns through the opening.
5. There is no limit on the number of times the driver/operator maneuvers the apparatus to accomplish this exercise. However, no portion of the apparatus should extend over the boundary lines of the space.

# Driver/Operator

## Activity 3-5-1: Confined Space Turnaround

---

### Activity Illustration



## Driver/Operator

### Activity 3-6-1: Diminishing Clearance

---

## Diminishing Clearance Exercise

### Activity 3-6-1

**Format:** Individual

**Time Frame:** Open (based on a total of 16:00 hours for skills practice and completion)

#### Description

This exercise measures a driver/operator's ability to steer the apparatus in a straight line, judge distances both horizontal and vertical, and stop at a finish line. The driver/operator's speed should be great enough to necessitate quick judgment.

#### Materials

- Fire apparatus
- Tape measure
- Traffic cones
- Four (4) delineators
- Vertical obstacle

#### Instructions

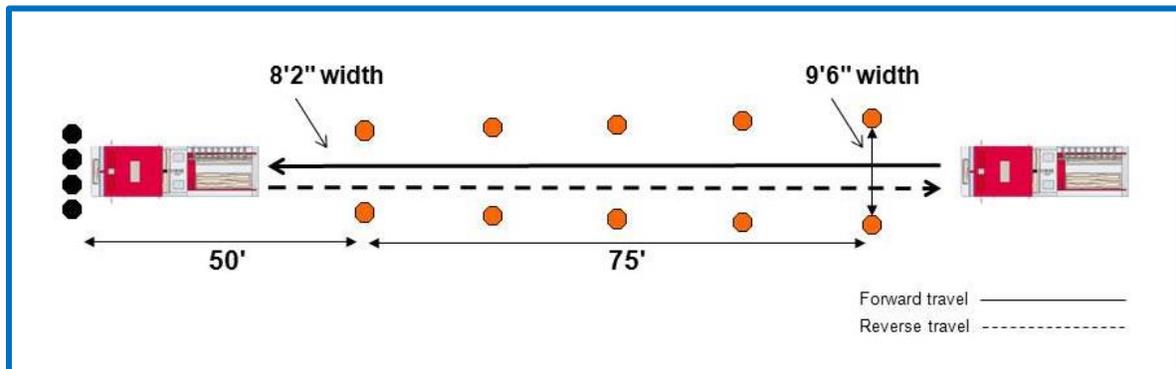
1. Establish a 75-foot lane using traffic cones.
2. The lane varies in width from 9'6" to a diminishing clearance that is 2" greater than the outside dimension of the tires on the apparatus being used.
3. Establish a finish line at the end of the lane that is 20 feet longer than the apparatus using traffic cones and at least one (1) delineator.
4. Establish at least one (1) adjustable vertical obstacle in the lane.
5. The driver/operator maneuvers the apparatus through this lane without touching the traffic cones or the vertical obstacle.
  - If the driver/operator determines the apparatus cannot clear the vertical obstacle, he or she should stop the apparatus.
6. The driver/operator stops the apparatus at the finish line with no portion of the apparatus protruding beyond the finish line.
7. The driver/operator drives back through the lane without touching the traffic cones or the vertical obstacle.
  - If the driver/operator determines the apparatus cannot clear the vertical obstacle, he or she should stop the apparatus.
8. The driver/operator stops after the front of the apparatus passes the last traffic cone.

## Driver/Operator

### Activity 3-6-1: Diminishing Clearance

---

#### Activity Illustration





# Pumping Apparatus Operations

## Course Plan

### Course Details

- Certification:** Fire Apparatus Driver/Operator – Pumping Apparatus
- CTS Guide:** Fire Apparatus Driver/Operator (Month 2015)
- Description:** This course provides information on pumping apparatus preventive maintenance and operations. 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. This course is based on the 2014 edition of *NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications*.
- Designed For:** Career and volunteer fire service personnel who drive and operate a fire department pumping apparatus
- Prerequisites:** Successfully completed OSFM Fire Fighter I  
Successfully completed Fire Apparatus Driver/Operator 1A  
Hold a valid Class C Firefighter Endorsed driver's license (minimum)
- Standard:** Complete all activities and skills  
Complete the summative test with a minimum score of 80%
- Hours:**
- |             |       |
|-------------|-------|
| Lecture:    | 16:00 |
| Activities: | 1:00  |
| Skills:     | 22:00 |
| Testing:    | 1:00  |
- Hours (Total):** 40:00
- Maximum Class Size:** 30
- Instructor Level:** This courses requires one (1) primary instructor and sufficient assistant instructors to meet the skills ratio
- Instructor/Student Ratio:** Lecture: 1:30 Skills: 1:5

## Fire Apparatus Driver/Operator 1B

---

**Restrictions:** Sufficient fire apparatus and adequate space to accommodate the students in the class and the required skills

**SFT Designation:** CFSTES

### Required Resources

#### Instructor Resources

To teach this course, instructors need:

- *Fire Apparatus Driver/Operator*, Second Edition, Jones & Bartlett, ISBN-13: 978-1-284-02691-7
- *or*
- *Aerial Apparatus Driver/Operator Handbook*, Third Edition, IFSTA, ISBN-13: 9780134027234
- Maintenance and inspection forms
- Manufacturer's specifications and requirements
- NFPA 13, NFPA 13D, NFPA 13E, NFPA 13R, and NFPA 14

#### Online Instructor Resources

The following instructor resources are available online at <http://osfm.fire.ca.gov/training/instructorscorner.php>:

- Fire Apparatus Driver/Operator 1B: Pumping Apparatus Operations required activities

#### Student Resources

To participate in this course, students need:

- *Fire Apparatus Driver/Operator*, Second Edition, Jones & Bartlett, ISBN-13: 978-1-284-02691-7
- *or*
- *Aerial Apparatus Driver/Operator Handbook*, Third Edition, IFSTA, ISBN-13: 9780134027234
- Personal protective clothing

#### 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

## Fire Apparatus Driver/Operator 1B

---

- 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 clothing
- Adequate space to accommodate the required skills

DRAFT

## 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, 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
  - Required student resources
  - Class participation requirements

#### Discussion Questions

1. What is a formative test? What is a summative test?

#### Activities

1. To be determined by the instructor.

### Topic 1-2: Fire Apparatus Driver/Operator – Pumping Apparatus Certification Process

#### Terminal Learning Objective

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

## Fire Apparatus Driver/Operator 1B

---

### Enabling Learning Objectives

1. Identify the courses required for Fire Apparatus Driver/Operator – Pumping Apparatus certification
  - Fire Apparatus Driver/Operator 1A: Driver/Operator
  - Fire Apparatus Driver/Operator 1B: Pumping Apparatus Operations
2. Identify any other requirements for certification
  - OSFM certified Fire Fighter I
  - Experience [one (1) of the following two (2) options]
    - Option 1: Have a minimum of one (1) year full-time, paid experience in a California fire department with the primary responsibility as a pumping apparatus driver/operator
    - Option 2: Have a minimum of two (2) years volunteer or part-time, paid experience in a California fire department with the primary responsibility as a pumping apparatus driver/operator
  - Be appointed to the rank or position of Fire Apparatus Driver/Operator
    - Performing in an acting capacity does not qualify
3. Describe the certification task book process
  - Complete all prerequisites and course work
  - Submit application and fees to request certification task book
  - Complete all job performance requirements included in the task book
  - Must have identified evaluator verify individual task completion via signature
  - Must have Fire Chief or authorized representative verify task book completion via signature
  - Must be employed by a California Fire Agency in the position prior to submitting completed task book to State Fire Training
4. Describe the certification testing process
  - Complete course work
  - Schedule online certification test
  - Schedule skills evaluation test

### Discussion Questions

1. How many courses are there in the Fire Apparatus Driver/Operator – Pumping Apparatus certification track? What are they?

### Activities

1. To be determined by the instructor.

### Unit 2: Preventive Maintenance

#### Topic 2-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Pumping Apparatus

##### 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 policies and procedures of the jurisdiction, will be able to perform and document routine tests, inspections, and servicing functions on the systems and components unique to a pumping apparatus to verify their operational status.

##### Enabling Learning Objectives

1. Recognize manufacturer specifications and requirements
2. Review policies and procedures of the jurisdiction, including documentation requirements
3. Describe pumping systems and components
  - Types
    - Positive displacement
    - Centrifugal
    - Single/multi stage
  - 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
7. Correct any deficiency noted according to policies and procedures and/or manufacturer specifications and requirements

##### Discussion Questions

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

### Activities

1. Have students draw a diagram of a pump and its related plumbing.

**CTS Guide Reference:** CTS 1-3

## Unit 3: Operations

### Topic 3-1: Produce an Effective Hand or Master Stream

#### 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 or 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. Explain hydraulic calculations for friction loss and flow using both written formulas and estimation methods
2. Explain pump discharge pressure calculations
3. Discuss proper positioning of a pumping apparatus
  - Hydrant
  - Standpipes
  - Drafting
4. Describe the safe operation of the pump
  - Introduction of water
  - Cavitation
  - Water hammer
  - Overheating
  - Discharge gates
  - Pressure control devices
5. Identify the problems related to small-diameter or dead-end mains
6. Discuss low-pressure and private water supply systems
7. Recognize hydrant coding systems
8. Describe the principles of drafting
9. Discuss the reliability of static sources
10. Position a pumping apparatus to operate at a fire hydrant and at a static water source
11. Power transfer from apparatus engine to pump
12. Draft
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 produce an effective stream

### Discussion Questions

1. What is the earliest indication of impending cavitation?
2. How does a discharge relief valve operate?

### Activities

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

### Instructor Note

1. Provide students with precourse material that refreshes their mathematic skills needed for hydraulic calculations

**CTS Guide Reference:** CTS 2-8

## Topic 3-2: Relay Pumping Operation

### Terminal Learning Objective

At the end of this topic, a student, given two or more pumping apparatus, a water source, 2½" or larger supply line, and a relay pumping evolution will be able to pump a 2½" or larger supply line to provide the correct pressure and flow to the next pumping apparatus in the relay.

### Enabling Learning Objectives

1. Explain the need for relay pumping operations
2. Explain hydraulic calculations for friction loss and flow using both written formulas and estimation methods
3. Explain pump discharge pressure calculations
4. Position a pumping apparatus to operate at a fire hydrant and a static water source
5. Power transfer from pumping apparatus engine to pump
6. Draft
7. Operate pumper pressure control systems
8. Operate the volume/pressure transfer valve (multistage pumps only)
9. Operate auxiliary cooling systems
10. Make the transition between internal and external water sources
11. Assemble hose lines, nozzles, valves, and appliances
12. 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?

### Activities

1. Activity 3-2-1: Relay Pumping Operation

**CTS Guide Reference:** CTS 2-9

### Topic 3-3: Produce 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. Explain equipment and assembly procedures
3. Identify foam system limitations
4. Discuss manufacturer's specifications and requirements
5. Operate foam proportioning equipment
6. Connect foam stream equipment

#### Discussion Questions

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

#### Activities

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

**CTS Guide Reference:** CTS 2-10

### Topic 3-4: Supply 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. Explain hydraulic calculations for friction loss and flow using both written formulas and estimation methods
2. Explain pump discharge pressure calculations
3. Discuss hose layouts
4. Identify the location of fire department connections
5. Discuss 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. Explain 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. Position a pumping apparatus to operate at a fire hydrant
10. Power transfer from pumping apparatus engine to pump
11. Operate pumper pressure control systems
12. Operate the volume/pressure transfer valve (multistage pumps only)
13. Operate auxiliary cooling systems
14. Make the transition between internal and external water sources

## Fire Apparatus Driver/Operator 1B

---

15. Assemble hose lines, nozzles, valves, and appliances
16. Apply hydraulic calculations to a 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 should you connect to a sprinkler or standpipe system? How?

### Activities

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

**CTS Guide Reference:** CTS 2-11

DRAFT

## Fire Apparatus Driver/Operator 1B

### Time Table

Segment	Lecture Time	Activity/Skills Time	Total Unit Time
<b>Unit 1: Introduction</b>			
Topic 1-1: Orientation and Administration			
Lecture	0:30		
To be determined by the instructor		0:00	
Topic 1-2: Pumping Apparatus Certification Process			
Lecture	0:30		
To be determined by the instructor		0:00	
<b>Unit 1 Totals</b>	<b>1:00</b>	<b>0:00</b>	<b>1:00</b>
<b>Unit 2: Preventive Maintenance</b>			
Topic 2-1: Perform Routine Tests, Inspections, and Servicing Functions Unique to Pumping Apparatus			
Lecture	3:00		
Recommended by State Fire Training		1:00	
<b>Unit 2 Totals</b>	<b>3:00</b>	<b>1:00</b>	<b>4:00</b>
<b>Unit 3: Operations</b>			
Topic 3-1: Produce an Effective Hand or Master Stream			
Lecture	8:00		
To be determined by the instructor			
Activity 3-1-1: Produce an Effective Hand or Master Stream		*	
Topic 3-2: Relay Pumping Operation			
Lecture	1:00		
To be determined by the instructor			
Activity 3-2-1: Relay Pumping Operation		*	
Topic 3-3: Produce a Foam Fire Stream			
Lecture	1:00		
To be determined by the instructor			
Activity 3-3-1: Produce a Foam Fire Stream		*	
Topic 3-4: Supply Water to Fire Sprinkler and Standpipe Systems			
Lecture	2:00		
To be determined by the instructor			
Activity 3-4-1: Supply Water to Fire Sprinkler and Standpipe Systems		*	

## Fire Apparatus Driver/Operator 1B

---

Segment	Lecture Time	Activity/Skills Time	Total Unit Time
<b>Unit 3 Totals</b>	<b>12:00</b>	<b>22:00</b>	<b>34:00</b>
<b>Lecture, Activity, and Unit Totals:</b>	<b>16:00</b>	<b>23:00</b>	<b>39:00</b>

### Course Totals

Total Lecture Time (LT)	16:00
Total Activity Time (AT)	1:00
Total Skills Time (ST)	*22:00
Total Testing Time (TT)	1:00
<b>Total Course Time</b>	<b>40:00</b>

Note: Skills time will vary depending on the number of students in the program. It is important to remember that the suggested skill hours are for 30 students.

# Pumping Apparatus Operations

## Activity 3-1-1: Effective Hand or Master Stream

---

### Produce an Effective Hand or Master Stream

#### Activity 3-1-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 5.2.1**

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

- (1) Internal tank
- (2) Pressurized source
- (3) Static source
- (4) Transfer from internal tank to external source

**Format:** Individual

**Time Frame:** Open (based on a total of 22:00 hours for skills practice and completion)

#### **Description**

This activity provides students with an opportunity to practice the job performance requirement from the four identified water sources.

#### **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
- Personal protective clothing

#### **Instructor Notes**

- These four skills identified under JPR 5.2.1 shall be demonstrated prior to the students practicing and completing each skill.

# Pumping Apparatus Operations

## Activity 3-2-1: Relay Pumping Operations

---

### Relay Pumping Operation

#### Activity 3-2-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 5.2.2**

Pump a supply line of 2½" 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 pumper in the relay.

**Format:** Individual

**Time Frame:** Open (based on a total of 22:00 hours for skills practice and completion)

#### **Description**

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

#### **Materials**

- Two (2) pumping apparatus
- Tools and equipment
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 5.2.2 shall be demonstrated prior to the students practicing and completing the skill.

# Pumping Apparatus Operations

## Activity 3-3-1: Foam Fire Stream

---

### Produce a Foam Fire Stream

#### Activity 3-3-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 5.2.3**

Produce a foam fire stream, given foam-producing equipment, so that properly proportioned foam is provided.

**Format:** Individual

**Time Frame:** Open (based on a total of 22:00 hours for skills practice and completion)

#### **Description**

This activity provides students with an opportunity to practice the job performance requirement to properly proportion the foam and produce a foam fire stream.

#### **Materials**

- Pumping apparatus
- Foam portioning system
- Foam or foam substitute
- Tools and equipment
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 5.2.3 shall be demonstrated prior to the students practicing and completing the skill.

## Pumping Apparatus Operations

### Activity 3-4-1: Fire Sprinkler or Standpipe Systems

---

## Supply Water to Fire Sprinkler or Standpipe Systems

### Activity 3-4-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- Paragraph 5.2.4

Supply water to fire sprinkler and standpipe systems, given specific system information and a fire department pumper, so that water is supplied to the system at the correct volume and pressure.

**Format:** Individual

**Time Frame:** Open (based on a total of 22:00 hours for skills practice and completion)

#### **Description**

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

#### **Materials**

- Pumping apparatus
- Sprinkler system or mockup appliance
- Standpipe system or mockup appliance
- Tools and equipment
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 5.2.4 shall be demonstrated prior to the students practicing and completing the skill.

---

# Fire Apparatus Driver/Operator – Aerial Apparatus

---

## Certification Training Standards Guide [Month 2015]

Cover Photo



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

---

---

# Fire Apparatus Driver/Operator – Aerial Apparatus

## Certification Training Standards Guide [Month 2015]

This CTS guide utilizes NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014) to provide the qualifications for State Fire Training's Fire Apparatus Driver/Operator – Aerial Apparatus certification.

State Fire Training coordinated the development of this CTS guide. Before its publication, the Statewide Training and Education Advisory Committee (STEAC) and the State Board of Fire Services (SBFS) recommended this CTS guide for adoption by the Office of the State Fire Marshal (OSFM).

**CALIFORNIA  
STATE FIRE**



**TRAINING**

Published by State Fire Training  
1131 S Street, Sacramento, CA 95811  
(916) 445-8200

Cover photo courtesy of [name, organization]

---

# Table of Contents

State Fire Training .....	1
Acknowledgments.....	2
How to Read a CTS Guide.....	5
Fire Apparatus Driver/Operator – Aerial.....	7
Section 1: Preventive Maintenance .....	7
1-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Aerial Apparatus .....	7
Section 2: Operations.....	8
2-1: Maneuver and Position an Aerial Apparatus.....	8
2-2: Stabilize an Aerial Apparatus .....	9
2-3: Maneuver and Position an Aerial Device from Each Control Station .....	10
2-4: Lower an Aerial Device using the Emergency Operating System .....	11
2-5: Deploy and Operate an Elevated Master Stream .....	12
State Fire Training Content.....	13

# State Fire Training

## Mission

To enable the California Fire Service to safely protect life and property through education, training, and certification.

## The California Fire Services 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.

CFSTES facilitates, coordinates, and assists in the development and implementation of standards and certification for the California fire service. CFSTES:

1. Administers the California Fire Academy System
2. Provides accredited courses leading to certification and approved standardized training programs for local and regional delivery
3. Administers the national accreditation process in California
4. Publishes certification training standards, course plans, and a certification task book for each certified level in the California fire service

CFSTES is a fire service system developed by the fire service, for the fire service. It is only as successful and effective as the people involved in it.

## Acknowledgments

State Fire Training appreciates the hard work and accomplishments of those who built the solid foundation on which this program continues to grow.

State Fire Training gratefully acknowledges the following individuals and organizations for their diligent efforts and contributions that made the development and publication of this document possible.

### CAL FIRE

**Ken Pimlott**

*Director, CAL FIRE*

**Tonya Hoover**

*State Fire Marshal*

**Mike Richwine**

*Assistant State Fire Marshal*

**Vacant**

*Chief, State Fire Training*

**Ron Coleman**

*Chair, STEAC*

### Cadre Leadership

**Mark Romer**

*Cadre Leader*

*Fire Service Training Specialist III, Office of the State Fire Marshal*

**Alicia Hamilton**

*Cadre Editor*

*Sacramento State*

### Cadre Members

**Jonathan Black**

*Captain, Santa Clara County Fire Department*

*Development and Validation Cadre*

**Bruce Fosdike**

*Captain, CAL FIRE (Retired), San Luis Obispo Unit  
Development Cadre*

**Daniel Hoy**

*Engineer, Sacramento Metropolitan Fire District  
Development Cadre*

**Timothy McIntyre**

*Engineer, Los Angeles County Fire Department  
Development and Validation Cadre*

**Drew Oliphant**

*Engineer, Los Angeles Fire Department  
Development and Validation Cadre*

**Ann Johnston Rosales**

*Battalion Chief, CAL FIRE/Fire Academy  
Development and Validation Cadre*

**Steve Walton**

*Engineer, Larkspur Fire Department  
Development Cadre*

**Karen Wilson**

*Lieutenant, Mariposa County Fire Department  
Development and Validation Cadre*

## **Validation Members**

**Craig Berchtold**

*Engineer, Livermore-Pleasanton Fire Department  
Validation Cadre*

**Bret Black**

*Captain, Clovis Fire Department  
Validation Cadre*

**Steve Castagnola**

*Engineer, San Bernardino County Fire Department  
Validation Cadre*

**Boyd Clegg**

*Assistant Chief, Vacaville Fire Protection District  
Validation Cadre*

**Jim Colston**

*Captain, San Marcos Fire Department  
Validation Cadre*

**DeWayne Felkins**

*Captain, Sacramento Fire Department  
Validation Cadre*

**John Malone**

*Captain, Dixon Fire Department  
Validation Cadre*

**Kelly Tassone**

*Captain (Retired), Sacramento Metropolitan Fire District  
Validation Cadre*

**Tanisha Tucker**

*Engineer, Oakland Fire Department  
Validation Cadre*

## Partners

State Fire Training also extends special acknowledgement and appreciation to the Conference and Training Services Unit with the College of Continuing Education at California State University, Sacramento, for its ongoing meeting logistics and curriculum development support, innovative ideas, and forward-thinking services. This collaboration is made possible through an interagency agreement between CAL FIRE and Sacramento State.

## How to Read a CTS Guide

State Fire Training develops a Certification Training Standards (CTS) Guide for a variety of job functions in the fire service such as firefighter, driver/operator, fire instructor, and company officer. The CTS guide lists the requisite knowledge and skills and the job performance requirements a person is expected to complete in order to become certified in a specific function. CTS guides are appropriate for fire service personnel and individuals in related occupations pursuing State Fire Training certification.

Each CTS guide serves as a foundation for the certification programs recommended for adoption by the Office of the State Fire Marshal. Any certification program must be based on job-related knowledge and measurable performance standards. To master the knowledge and skills needed for specialized operations, individuals will require additional training to augment the performance standards included in the CTS guide.

Within the CTS guide, it is impossible to capture the different policies and procedures of each organization in the California fire service. Individuals aspiring to meet State Fire Training's certification training standards must do so in accordance with the codes, standards, regulations, policies, and standard operating procedures applicable within their own departments or jurisdictions.

### Format

Each certification training standard included in the CTS guide includes the following:

#### Section Heading

The section heading describes a general category for a group of training standards. For example, the Fire Marshal CTS includes the following sections: Administration, Risk Management, Community Relations, Professional Development, Regulatory Programs, Fire and Life Safety, and Investigation. Each section contains one or more individual training standards.

#### Training Standard Title

The training standard title provides a general description of the performance requirement contained within the standard.

#### Authority

The CTS guide references each standard with one or more paragraphs of the corresponding National Fire Protection Association (NFPA) Professional Qualifications. This ensures that each fire service function within California's certification system meets or exceeds NFPA standards.

When California requirements exceed the NFPA standard, the CTS guide cites the Office of the State Fire Marshal as the authority and prints the corresponding information in *italics*.

### **Given**

This section lists the objects, equipment, materials, or facilities an individual needs in order to acquire the requisite knowledge and skills or to accomplish the job performance requirement(s) within a training standard.

### **Requisite Knowledge and Skills**

This section lists the knowledge and skills that an individual must acquire in order to accomplish the job performance requirement(s) within a training standard.

This section does not include NFPA requisite knowledge or skills that are too general to teach or that individuals should develop through life experiences. For example, a training standard would not list “communicate orally and in writing” or “ability to relate interpersonally” unless they specifically apply to a job performance requirement about acquiring communication skills or developing interpersonal relationships.

### **Job Performance Requirements**

This section includes one or more written statements that describe a specific job-related task and define measurable or observable outcomes. After an individual completes all coursework and requisite requirements, the certification task book process verifies completion of job performance requirements.

## **Content**

In addition to the individual certification training standards, the CTS guide also includes State Fire Training Revisions and Errata pages.

### **State Fire Training Content**

Located at the back of the CTS guide, this table documents any significant revisions made by State Fire Training to the NFPA standards in the development of this CTS guide. This table is used to justify content additions and advise the course plan development team.

### **Errata**

Located at the back of the CTS guide, this page documents any changes made to the CTS guide outside of the five-year NFPA revision cycle.

# Fire Apparatus Driver/Operator – Aerial Apparatus

## Section 1: Preventive Maintenance

### 1-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Aerial Apparatus

#### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 6.1.1

Office of the State Fire Marshal

#### Given

1. Aerial apparatus
2. *Tools and equipment*
3. *Maintenance and inspection forms*
4. *Manufacturer's specifications and requirements*
5. Policies and procedures of the jurisdiction

#### Requisite Knowledge and Skills

1. *Recognize manufacturer specifications and requirements*
2. *Review policies and procedures of the jurisdiction, including documentation requirements*
3. *Describe aerial apparatus systems and components*
4. *Use tools and equipment*
5. *Inspect aerial apparatus and components*
6. *Recognize system problems and out-of-service criteria*
7. *Correct any deficiency noted according to policies and procedures and/or manufacturer specifications and requirements*

#### Job Performance Requirements

Perform and document routine tests, inspections, and servicing functions on the systems and components unique to an aerial apparatus to verify their operational status.

## Section 2: Operations

### 2-1: Maneuver and Position an Aerial Apparatus

#### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 6.2.1

Office of the State Fire Marshal

#### Given

1. Aerial apparatus
2. Incident location
3. Situation description
4. Assignment

#### Requisite Knowledge and Skills

1. *Explain* capabilities and limitations of aerial devices related to reach, tip load, angle of inclination, and angle from chassis axis
2. *Discuss the* effects of topography, ground, and weather conditions on deployment
3. *Describe* uses for an aerial device
4. *Discuss options for the placement of an aerial apparatus*
5. *Determine load limit of the aerial device*
6. Determine a correct position for the *aerial* apparatus
7. Maneuver *the aerial* apparatus into *the correct* position
8. Avoid obstacles to operations

#### Job Performance Requirements

Maneuver and position an aerial apparatus for correct aerial device deployment.

## 2-2: Stabilize an Aerial Apparatus

### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 6.2.2

### Given

1. Positioned *aerial apparatus*
2. Manufacturer's specifications *and requirements*

### Requisite Knowledge and Skills

1. *Describe* aerial apparatus hydraulic systems
2. *Explain* manufacturer's specifications *and* requirements for stabilization
3. *Discuss the* effects of topography and ground conditions on stabilization
4. Transfer power from the aerial apparatus engine to the hydraulic system
5. Operate aerial apparatus stabilization devices.

### Job Performance Requirements

Stabilize an aerial apparatus and transfer power to the aerial device hydraulic system in order to deploy the aerial device.

## 2-3: Maneuver and Position an Aerial Device from Each Control Station

### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 6.2.3

Office of the State Fire Marshal

### Given

1. *Stabilized aerial apparatus*
2. Incident location
3. Situation description
4. Assignment

### Requisite Knowledge and Skills

1. *Explain* aerial device hydraulic systems
2. *Explain* hydraulic pressure relief systems
3. *Identify* gauges and controls
4. *Describe* cable systems
5. *Discuss* communications systems
6. *Explain* electrical systems
7. *Explain* locking systems
8. *Discuss* platform stabilization
9. *Explain* aerial device safety systems
10. *Explain* system overrides and the hazards of using overrides
11. *Explain* safe operational limitations of the given aerial device
12. *Explain* safety procedures specific to the device
13. *Discuss* operations near electrical hazards and overhead obstructions
14. Raise, rotate, extend, position to a specified location and lock
15. Unlock, retract, rotate, lower, and bed the aerial device

### Job Performance Requirements

Maneuver and position the aerial device from each control station to accomplish the assignment.

## **2-4: Lower an Aerial Device using the Emergency Operating System**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 6.2.4

### **Given**

1. Deployed aerial device

### **Requisite Knowledge and Skills**

1. *Describe* emergency operating systems
2. *Explain* manual rotation and lowering systems
3. *Explain* aerial device safety systems
4. *Explain* system overrides and the hazards of using overrides
5. *Explain* safe operational limitations of the given aerial device
6. *Explain* safety procedures specific to manual overrides
7. Unlock, retract, rotate lower, and bed the aerial device using the emergency operating system

### **Job Performance Requirements**

Lower an aerial device using the emergency operating system to its bedded position.

## 2-5: Deploy and Operate an Elevated Master Stream

### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 6.2.5

Office of the State Fire Marshal

### Given

1. *Stabilized* aerial device
2. Master stream device
3. A desired flow

### Requisite Knowledge and Skills

1. *Discuss the types of elevated master stream devices and waterways*
2. *Discuss staffing master stream devices*
3. *Explain* nozzle reaction
4. *Explain* range of operation
5. *Describe* waterway locking systems
6. *Discuss* weight limitations
7. Connect a water supply to a master stream device
8. Control an elevated nozzle manually or remotely

### Job Performance Requirements

Deploy and operate an elevated master stream so the stream is effective and the aerial and master stream devices are operated correctly.

## State Fire Training Content

**Code Key**

**Blocks**

- G = Given
- RKS = Requisite Knowledge and Skills
- JPR = Job Performance Requirements
- NCTS = New certification training standard

**Sources**

- [ACRONYM = Title]
- [ACRONYM = Title]
- [ACRONYM = Title]

### Certification: Fire Apparatus Driver/Operator – Aerial Apparatus

CTS	Block	Addition	Justification	Source/Reference
1-1	G	Tools and equipment	[Text]	[Text]
1-1	G	Maintenance and inspection forms		
1-1	RKS	Describe aerial apparatus systems and components		
1-1	RKS	Inspect aerial apparatus and components		
2-1	RKS	Discuss options for the placement of an aerial apparatus		
2-1	RKS	Determine load limit of the aerial device		
2-3	G	Stabilized aerial apparatus		
2-5	RKS	Discuss the types of elevated master stream devices and waterways		
2-5	RKS	Discuss staffing master stream devices		
2-5	RKS	Describe waterway locking systems		



# Aerial Apparatus Operations

## Course Plan

### Course Details

<b>Certification:</b>	Fire Apparatus Driver/Operator – Aerial Apparatus
<b>CTS Guide:</b>	Fire Apparatus Driver/Operator (Month 2015)
<b>Description:</b>	This course provides information on aerial apparatus preventive maintenance and operations. Topics include routine tests, inspections, and servicing functions on the systems and components unique to an aerial apparatus; maneuvering, positioning, and stabilizing an aerial apparatus; maneuvering, positioning, and lowering the aerial device; and deploying and operating an elevated master stream. This course is based on the 2014 edition of <i>NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications</i> .
<b>Designed For:</b>	Career and volunteer fire service personnel who drive and operate a fire department aerial apparatus
<b>Prerequisites:</b>	Successfully completed OSFM Fire Fighter I training Successfully completed Fire Apparatus Driver/Operator 1A Hold a valid Class C Firefighter Endorsed driver's license (minimum) Completed a minimum of four (4) hours driving an aerial apparatus Completed the activities from Driver/Operator 1A while driving an aerial apparatus
<b>Standard:</b>	Complete all activities and skills Complete the summative test with a minimum score of 80%
<b>Hours:</b>	Lecture: 21:00 Activities: 1:00 Skills: 17:00 Testing: 1:00
<b>Hours (Total):</b>	40:00
<b>Maximum Class Size:</b>	30

## Aerial Apparatus Operations

---

**Instructor Level:** This course requires one (1) primary instructor and sufficient assistant instructors to meet the skills ratio

**Instructor/Student Ratio:** Lecture: 1:30 Skills: 1:10

**Restrictions:** Sufficient fire apparatus and adequate space to accommodate the students in the class and the required skills

**SFT Designation:** CFSTES

### Required Resources

#### Instructor Resources

To teach this course, instructors need:

- *Fire Apparatus Driver/Operator*, Second Edition, Jones & Bartlett, ISBN-13: 978-1-284-02691-7
- *or*
- *Aerial Apparatus Driver/Operator Handbook*, Third Edition, IFSTA, ISBN-13: 9780134027234
- Maintenance and inspection forms
- Manufacturer's specifications and requirements

#### Online Instructor Resources

The following instructor resources are available online at <http://osfm.fire.ca.gov/training/instructorscorner.php>:

- Aerial Apparatus Operations required activities

#### Student Resources

To participate in this course, students need:

- *Fire Apparatus Driver/Operator*, Second Edition, Jones & Bartlett, ISBN-13: 978-1-284-02691-7
- *or*
- *Aerial Apparatus Driver/Operator Handbook*, Third Edition, IFSTA, ISBN-13: 9780134027234
- Personal protective clothing

#### 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

## Aerial Apparatus Operations

---

- Amplification devices
- Projector and screen
- Sufficient aerial apparatus to accommodate the number of students in the class
- Qualified assistant (as needed)
- Tools and equipment for inspection and testing
- Personal protective clothing
- Pressurized water source
- Facility and/or location with space sufficient to accommodate maneuvering the apparatus and deploying the aerial, stabilizing the apparatus and transferring power, maneuvering, stabilizing, and lowering the aerial device, deploy and operate an elevated master stream

DRAFT

## 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, 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
  - Required student resources
  - Class participation requirements

#### Discussion Questions

1. What is a formative test? What is a summative test?

#### Activities

1. To be determined by the instructor.

### Topic 1-2: Fire Apparatus Driver/Operator – Aerial Apparatus Certification Process

#### Terminal Learning Objective

At the end of this topic, a student will be able to identify the courses and requirements for the Fire Apparatus Driver/Operator – Aerial Apparatus certification, and be able to describe the certification task book and testing process.

## Aerial Apparatus Operations

---

### Enabling Learning Objectives

1. Identify the courses required for Fire Apparatus Driver/Operator – Aerial Apparatus certification
  - Fire Apparatus Driver/Operator 1A
  - Aerial Apparatus 1
2. Identify any other requirements for Fire Apparatus Driver/Operator – Aerial Apparatus certification
  - OSFM certified Fire Fighter I
  - Experience [one (1) of the following two (2) options]
    - Option 1: Have a minimum of one (1) year full-time, paid experience in a California fire department with the primary responsibility as an aerial apparatus driver/operator
    - Option 2: Have a minimum of two (2) years volunteer or part-time, paid experience in a California fire department with the primary responsibility as an aerial apparatus driver/operator
  - Be appointed to the rank or position of Fire Apparatus Driver/Operator
    - Performing in an acting capacity does not qualify
3. Describe the certification task book process
  - Complete all prerequisites and course work
  - Submit application and fees to request certification task book
  - Complete all job performance requirements included in the task book
  - Must have identified evaluator verify individual task completion via signature
  - Must have Fire Chief or authorized representative verify task book completion via signature
  - Must be employed by a California Fire Agency in the position prior to submitting completed task book to State Fire Training
4. Describe the certification testing process
  - Complete course work
  - Schedule online certification test
  - Schedule skills evaluation test

### Discussion Questions

1. How many courses are there in the Fire Apparatus Driver/Operator - Aerial Apparatus certification track? What are they?

### Activities

1. To be determined by the instructor.

### Unit 2: Preventive Maintenance

#### Topic 2-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Aerial Apparatus

##### Terminal Learning Objective

At the end of this topic, a student, given an aerial apparatus, tools and equipment, maintenance and inspection forms, manufacturer's specifications and requirements, and policies and procedures of the jurisdiction, will be able to perform and document routine tests, inspections, and servicing functions on the systems and components unique to an aerial apparatus to verify their operational status.

##### Enabling Learning Objectives

1. Recognize manufacturer specifications and requirements
2. Review policies and procedures of the jurisdiction, including documentation requirements
3. Describe aerial apparatus systems and components
  - Aerial device electrical systems
  - Aerial device hydraulic systems
  - Aerial device safety systems
  - Aerial ladder
  - Aerial waterway
  - Breathing air systems
  - Cable systems (if applicable)
  - Communication systems
  - Slides and rollers
  - Stabilizing systems
4. Use tools and equipment
5. Inspect aerial apparatus and components
6. Recognize system problems and out-of-service criteria
7. Correct any deficiency noted according to policies and procedures and/or manufacturer specifications and requirements

##### Discussion Questions

1. How often is maintenance performed?
2. What will cause your aerial device to become out of service?
3. How often is your aerial ladder recertified? By whom?

##### Activities

1. Divide students into small groups. Have each group perform an aerial apparatus inspection using a form provided by the instructor and present their findings.

**CTS Guide Reference:** CTS 1-1

### Unit 3: Operations

#### Topic 3-1: Maneuver and Position an Aerial Apparatus

##### Terminal Learning Objective

At the end of this topic, a student, given an aerial apparatus, incident location, situation description, and assignment will be able to maneuver and position an aerial apparatus for correct aerial device deployment.

##### Enabling Learning Objectives

1. Describe uses for an aerial device
2. Explain capabilities and limitations of aerial devices
  - Reach
  - Tip load
  - Angle of inclination
  - Angle from chassis axis
3. Discuss the effects of topography, ground, and weather conditions on deployment
4. Discuss options for the placement of an aerial apparatus
5. Determine load limit of the aerial device
6. Determine a correct position for the apparatus
7. Maneuver the apparatus into the correct position
8. Avoid obstacles to operations

##### Discussion Questions

1. How much space do you need for your stabilizer deployment?
2. How should an aerial apparatus be placed at a/an \_\_\_\_\_ incident?
3. What is the maximum degree of slope allowable to maintain full aerial capabilities?
4. Can you operate below grade? If yes, how far?

##### Activities

1. Activity 3-1-1: Maneuver and Position an Aerial Apparatus

**CTS Guide Reference:** CTS 2-1

#### Topic 3-2: Stabilize an Aerial Apparatus

##### Terminal Learning Objective

At the end of this topic, a student, given a positioned aerial apparatus and manufacturer's specifications and requirements, will be able to stabilize an aerial apparatus and transfer power to the aerial device hydraulic system in order to deploy the aerial device.

##### Enabling Learning Objectives

1. Describe aerial apparatus hydraulic systems
2. Explain manufacturer's specifications and requirements for stabilization
  - A-frame
  - H configuration
  - Torque box
3. Discuss the reasons for short-jacking and its limitations

## Aerial Apparatus Operations

---

4. Discuss the effects of topography and ground conditions on stabilization
5. Transfer power from the aerial apparatus engine to the hydraulic system
6. Operate aerial apparatus stabilization devices

### Discussion Questions

1. What should you consider when placing your stabilizers?
2. What is short-jacking? When is it used?
3. Where do you place your chock blocks?
4. Do you need to raise the tires off the ground for proper stabilization?

### Activities

1. Activity 3-2-1: Stabilize an Aerial Apparatus

**CTS Guide Reference:** CTS 2-2

## Topic 3-3: Maneuver and Position an Aerial Device from Each Control Station

### Terminal Learning Objective

At the end of this topic, a student, given a stabilized aerial apparatus, incident location, situation description, and an assignment, will be able to maneuver and position the aerial device from each control station to accomplish the assignment.

### Enabling Learning Objectives

1. Explain aerial device hydraulic systems
2. Explain hydraulic pressure relief systems
3. Identify gauges and controls
4. Describe cable systems
5. Discuss communications systems
6. Explain electrical systems
7. Explain locking systems
  - Cable dog locks
  - Holding valves
8. Discuss platform stabilization
9. Explain aerial device safety systems
10. Explain system overrides and the hazards of using overrides
11. Explain safe operational limitations of the given aerial device
12. Explain safety procedures specific to the device
13. Discuss operations near electrical hazards and overhead obstructions
14. Raise, rotate, extend, position to a specified location and lock
15. Unlock, retract, rotate, lower, and bed the aerial device

### Discussion Questions

1. When do you use your overrides in a nonemergency situation?
2. What is your jurisdiction's policy for operating near power lines?
3. How do you decrease ladder fatigue and damage when operating the aerial?
4. What hazards are associated with a supported aerial?
5. Can you operate multiple levers at the same time?
6. What is the closed or retracted measurement of your aerial?

## Aerial Apparatus Operations

---

7. What ladder position offers the most stability? Why?
8. If there is a hydraulic failure, what holds the ladder in position?

### Activities

1. Activity 3-3-1: Maneuver and Position an Aerial Device from Each Control Station

**CTS Guide Reference:** CTS 2-3

## Topic 3-4: Lower an Aerial Device using the Emergency Operating System

### Terminal Learning Objective

At the end of this topic, a student, given a deployed aerial device, will be able to lower an aerial device using the emergency operating system to its bedded position.

### Enabling Learning Objectives

1. Describe emergency operating systems
2. Explain manual rotation and lowering systems
3. Explain system overrides and the hazards of using overrides
4. Explain safety procedures specific to manual overrides
5. Unlock, retract, rotate, lower, and bed the aerial device using the emergency operating system

### Discussion Questions

1. Who is responsible when you use the emergency system overrides?
2. In which situations are the manual overrides used?
3. Which sensors are disabled in override mode?
4. What is an EPU, where is it, and what is its maximum running time?

### Activities

1. Activity 3-4-1: Lower an Aerial Device using the Emergency Operating System

**CTS Guide Reference:** CTS 2-4

## Topic 3-5: Deploy and Operate an Elevated Master Stream

### Terminal Learning Objective

At the end of this topic, a student, given a stabilized aerial device, pumping apparatus, pressurized water source, master stream device, and a desired flow, will be able to deploy and operate an elevated master stream so the stream is effective and the aerial and master stream devices are operated correctly.

### Enabling Learning Objectives

1. Discuss the types of elevated master stream devices and waterways
2. Discuss operating master stream devices
  - Manually
  - Remotely
3. Explain nozzle reaction
4. Explain range of operation
5. Describe waterway locking systems
6. Discuss weight limitations
7. Connect a water supply to a master stream device

## Aerial Apparatus Operations

---

8. Control an elevated nozzle manually or remotely

### Discussion Questions

1. What is the maximum lateral movement of the stream?
2. What is the sequence to start and stop the flow of water from the nozzle?
3. What are your limitations for water tower operations?
4. Do you wear a ladder belt when operating at the tip of a master stream?

### Activities

1. Activity 3-5-1: Deploy and Operate an Elevated Master Stream Activity

**CTS Guide Reference:** CTS 2-5

DRAFT

## Aerial Apparatus Operations

### Time Table

Segment	Lecture Time	Activity/Skills Time	Total Unit Time
<b>Unit 1: Introduction</b>			
Topic 1-1: Orientation and Administration			
Lecture	0:30		
To be determined by the instructor		0:00	
Topic 1-2: Aerial Apparatus Certification Process			
Lecture	0:30		
To be determined by the instructor		0:00	
<b>Unit 1 Totals</b>	<b>1:00</b>	<b>0:00</b>	<b>1:00</b>
<b>Unit 2: Preventive Maintenance</b>			
Topic 2-1: Perform Routine Tests, Inspections, and Servicing Functions Unique to Aerial Apparatus			
Lecture	6:00		
Recommended by State Fire Training		1:00	
<b>Unit 2 Totals</b>	<b>6:00</b>	<b>1:00</b>	<b>7:00</b>
<b>Unit 3: Operations</b>			
Topic 3-1: Maneuver and Position an Aerial Apparatus			
Lecture	4:00		
Activity 3-1-1: Maneuver and Position an Aerial Apparatus		*	
Topic 3-2: Stabilize an Aerial Apparatus			
Lecture	1:30		
Activity 3-2-1: Stabilize an Aerial Apparatus		*	
Topic 3-3: Maneuver and Position an Aerial Device from Each Control Station			
Lecture	3:30		
Activity 3-3-1: Maneuver and Position an Aerial Device from Each Control Station		*	
Topic 3-4: Lower an Aerial Device using the Emergency Operating System			
Lecture	2:00		
Activity 3-4-1: Lower an Aerial Device using the Emergency Operating System		*	

## Aerial Apparatus Operations

---

Segment	Lecture Time	Activity/Skills Time	Total Unit Time
Topic 3-5: Deploy and Operate an Elevated Master Stream			
Lecture	2:00		
Activity 3-5-1: Deploy and Operate an Elevated Master Stream		*	
<b>Unit 3 Totals</b>	<b>14:00</b>	<b>17:00</b>	<b>31:00</b>
<b>Lecture, Activity, and Unit Totals:</b>	<b>21:00</b>	<b>18:00</b>	<b>39:00</b>

### Course Totals

Total Lecture Time (LT)	21:00
Total Activity Time (AT)	1:00
Total Skills Time (ST)	*17:00
Total Testing Time (TT)	1:00
<b>Total Course Time</b>	<b>40:00</b>

Note: Skills time will vary depending on the number of students in the program. It is important to remember that the suggested skill hours are for 30 students.

# Aerial Apparatus Operations

## Activity 3-1-1: Maneuver and Position an Aerial Apparatus

---

### Maneuver and Position an Aerial Apparatus

#### Activity 3-1-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 6.2.1**

Maneuver and position an aerial apparatus, given an aerial apparatus, an incident location, a situation description, and an assignment, so that the apparatus is positioned for correct aerial device deployment.

**Format:** Individual

**Time Frame:** Open (based on a total of 17:00 hours for skills practice and completion)

#### **Description**

This activity provides students with an opportunity to practice the job performance requirement to maneuver and position an aerial apparatus for correct aerial deployment.

#### **Materials**

- Aerial apparatus
- Facility and/or location with space sufficient to accommodate maneuvering the apparatus and deploying the aerial
- Tools and equipment
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 6.2.1 shall be demonstrated prior to the students practicing and completing each skill.

# Aerial Apparatus Operations

## Activity 3-2-1: Stabilize an Aerial Apparatus

---

### Stabilize an Aerial Apparatus

#### Activity 3-2-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 6.2.2**

Stabilize an aerial apparatus, given a positioned vehicle and the manufacturer's recommendations, so that power can be transferred to the aerial device hydraulic system and the device can be deployed.

**Format:** Individual

**Time Frame:** Open (based on a total of 17:00 hours for skills practice and completion)

#### **Description**

This activity provides students with an opportunity to practice the job performance requirement to stabilize an aerial apparatus and transfer power to the aerial device hydraulic system in order to deploy the aerial device.

#### **Materials**

- Aerial apparatus
- Facility and/or location with space sufficient to accommodate stabilizing the apparatus and transferring power
- Tools and equipment
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 6.2.2 shall be demonstrated prior to the students practicing and completing each skill.

## **Aerial Apparatus Operations**

### Activity 3-3-1: Maneuver and Position an Aerial Device from Each Control Station

---

## **Maneuver and Position an Aerial Device from Each Control Station**

### **Activity 3-3-1**

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 6.2.3**

Maneuver and position the aerial device from each control station, given an incident location, a situation description, and an assignment, so that the aerial device is positioned to accomplish the assignment.

**Format:** Individual

**Time Frame:** Open (based on a total of 17:00 hours for skills practice and completion)

#### **Description**

This activity provides students with an opportunity to practice the job performance requirement to maneuver and position the aerial device from each control station to accomplish the assignment.

#### **Materials**

- Aerial apparatus
- Facility and/or location with space sufficient to accommodate maneuvering and stabilizing the aerial device
- Qualified assistant (as needed)
- Tools and equipment
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 6.2.3 shall be demonstrated prior to the students practicing and completing each skill.

## **Aerial Apparatus Operations**

### Activity 3-4-1: Lower an Aerial Device using the Emergency Operating System

---

## **Lower an Aerial Device using the Emergency Operating System**

### **Activity 3-4-1**

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 6.2.4**

Lower an aerial device using the emergency operating system, given an aerial device, so that the aerial device is lowered to its bedded position.

**Format:** Individual

**Time Frame:** Open (based on a total of 17:00 hours for skills practice and completion)

#### **Description**

This activity provides students with an opportunity to practice the job performance requirement to lower an aerial device using the emergency operating system to its bedded position.

#### **Materials**

- Aerial apparatus
- Facility and/or location with space sufficient to accommodate lowering the aerial device
- Tools and equipment
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 6.2.4 shall be demonstrated prior to the students practicing and completing each skill.

## Aerial Apparatus Operations

### Activity 3-5-1: Deploy and Operate an Elevated Master Stream

---

## Deploy and Operate an Elevated Master Stream

### Activity 3-5-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- Paragraph 6.2.5

Deploy and operate an elevated master stream, given an aerial device, a master stream device, and a desired flow so that the stream is effective and the aerial and master stream devices are operated correctly.

**Format:** Individual

**Time Frame:** Open (based on a total of 17:00 hours for skills practice and completion)

#### **Description**

This activity provides students with an opportunity to practice the job performance requirement to deploy and operate an elevated master stream.

#### **Materials**

- Aerial and pumping apparatus
- Pressurized water source
- Facility and/or location with space sufficient to accommodate deploying and operating an elevated master stream
- Tools and equipment
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 6.2.5 shall be demonstrated prior to the students practicing and completing each skill.

# Fire Apparatus Driver/Operator – Tillered Apparatus

## Certification Training Standards Guide [Month 2015]



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

# Fire Apparatus Driver/Operator – Tillered Apparatus

## Certification Training Standards Guide [Month 2015]

This CTS guide utilizes NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014) to provide the qualifications for State Fire Training's Fire Apparatus Driver/Operator – Tillered Apparatus certification.

State Fire Training coordinated the development of this CTS guide. Before its publication, the Statewide Training and Education Advisory Committee (STEAC) and the State Board of Fire Services (SBFS) recommended this CTS guide for adoption by the Office of the State Fire Marshal (OSFM).



Published by State Fire Training  
1131 S Street, Sacramento, CA 95811  
(916) 445-8200

Cover photo courtesy of Timothy McIntyre, Los Angeles County Fire

# Table of Contents

State Fire Training .....	1
Acknowledgments.....	2
How to Read a CTS Guide.....	5
Fire Apparatus Driver/Operator – Tillered Apparatus .....	7
Section 1: Operations.....	7
1-1: Perform the Practical Driving Exercises .....	7
1-2: Operate a Tillered Apparatus.....	8
1-3: Position and Stabilize a Tillered Apparatus.....	9
State Fire Training Content.....	10

# State Fire Training

## Mission

To enable the California Fire Service to safely protect life and property through education, training, and certification.

## The California Fire Services 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.

CFSTES facilitates, coordinates, and assists in the development and implementation of standards and certification for the California fire service. CFSTES:

1. Administers the California Fire Academy System
2. Provides accredited courses leading to certification and approved standardized training programs for local and regional delivery
3. Administers the national accreditation process in California
4. Publishes certification training standards, course plans, and a certification task book for each certified level in the California fire service

CFSTES is a fire service system developed by the fire service, for the fire service. It is only as successful and effective as the people involved in it.

## Acknowledgments

State Fire Training appreciates the hard work and accomplishments of those who built the solid foundation on which this program continues to grow.

State Fire Training gratefully acknowledges the following individuals and organizations for their diligent efforts and contributions that made the development and publication of this document possible.

### CAL FIRE

**Ken Pimlott**

*Director, CAL FIRE*

**Tonya Hoover**

*State Fire Marshal*

**Mike Richwine**

*Assistant State Fire Marshal*

**Vacant**

*Chief, State Fire Training*

**Ron Coleman**

*Chair, STEAC*

### Cadre Leadership

**Mark Romer**

*Cadre Leader*

*Fire Service Training Specialist III, Office of the State Fire Marshal*

**Alicia Hamilton**

*Cadre Editor*

*Sacramento State*

### Cadre Members

**Jonathan Black**

*Captain, Santa Clara County Fire Department*

*Development and Validation Cadre*

## Acknowledgments

---

**Bruce Fosdike**

*Captain, CAL FIRE (Retired), San Luis Obispo Unit  
Development Cadre*

**Daniel Hoy**

*Engineer, Sacramento Metropolitan Fire District  
Development Cadre*

**Timothy McIntyre**

*Engineer, Los Angeles County Fire Department  
Development and Validation Cadre*

**Drew Oliphant**

*Engineer, Los Angeles Fire Department  
Development and Validation Cadre*

**Ann Johnston Rosales**

*Battalion Chief, CAL FIRE/Fire Academy  
Development and Validation Cadre*

**Steve Walton**

*Engineer, Larkspur Fire Department  
Development Cadre*

**Karen Wilson**

*Lieutenant, Mariposa County Fire Department  
Development and Validation Cadre*

## Validation Members

**Craig Berchtold**

*Engineer, Livermore-Pleasanton Fire Department  
Validation Cadre*

**Bret Black**

*Captain, Clovis Fire Department  
Validation Cadre*

**Steve Castagnola**

*Engineer, San Bernardino County Fire Department  
Validation Cadre*

## Acknowledgments

---

**Boyd Clegg**

*Assistant Chief, Vacaville Fire Protection District  
Validation Cadre*

**Jim Colston**

*Captain, San Marcos Fire Department  
Validation Cadre*

**DeWayne Felkins**

*Captain, Sacramento Fire Department  
Validation Cadre*

**John Malone**

*Captain, Dixon Fire Department  
Validation Cadre*

**Kelly Tassone**

*Captain (Retired), Sacramento Metropolitan Fire District  
Validation Cadre*

**Tanisha Tucker**

*Engineer, Oakland Fire Department  
Validation Cadre*

## Partners

State Fire Training also extends special acknowledgement and appreciation to the Conference and Training Services Unit with the College of Continuing Education at California State University, Sacramento, for its ongoing meeting logistics and curriculum development support, innovative ideas, and forward-thinking services. This collaboration is made possible through an interagency agreement between CAL FIRE and Sacramento State.

## How to Read a CTS Guide

State Fire Training develops a Certification Training Standards (CTS) Guide for a variety of job functions in the fire service such as firefighter, driver/operator, fire instructor, and company officer. The CTS guide lists the requisite knowledge and skills and the job performance requirements a person is expected to complete in order to become certified in a specific function. CTS guides are appropriate for fire service personnel and individuals in related occupations pursuing State Fire Training certification.

Each CTS guide serves as a foundation for the certification programs recommended for adoption by the Office of the State Fire Marshal. Any certification program must be based on job-related knowledge and measurable performance standards. To master the knowledge and skills needed for specialized operations, individuals will require additional training to augment the performance standards included in the CTS guide.

Within the CTS guide, it is impossible to capture the different policies and procedures of each organization in the California fire service. Individuals aspiring to meet State Fire Training's certification training standards must do so in accordance with the codes, standards, regulations, policies, and standard operating procedures applicable within their own departments or jurisdictions.

### Format

Each certification training standard included in the CTS guide includes the following:

#### Section Heading

The section heading describes a general category for a group of training standards. For example, the Fire Marshal CTS includes the following sections: Administration, Risk Management, Community Relations, Professional Development, Regulatory Programs, Fire and Life Safety, and Investigation. Each section contains one or more individual training standards.

#### Training Standard Title

The training standard title provides a general description of the performance requirement contained within the standard.

#### Authority

The CTS guide references each standard with one or more paragraphs of the corresponding National Fire Protection Association (NFPA) Professional Qualifications. This ensures that each fire service function within California's certification system meets or exceeds NFPA standards.

When California requirements exceed the NFPA standard, the CTS guide cites the Office of the State Fire Marshal as the authority and prints the corresponding information in *italics*.

### **Given**

This section lists the objects, equipment, materials, or facilities an individual needs in order to acquire the requisite knowledge and skills or to accomplish the job performance requirement(s) within a training standard.

### **Requisite Knowledge and Skills**

This section lists the knowledge and skills that an individual must acquire in order to accomplish the job performance requirement(s) within a training standard.

This section does not include NFPA requisite knowledge or skills that are too general to teach or that individuals should develop through life experiences. For example, a training standard would not list “communicate orally and in writing” or “ability to relate interpersonally” unless they specifically apply to a job performance requirement about acquiring communication skills or developing interpersonal relationships.

### **Job Performance Requirements**

This section includes one or more written statements that describe a specific job-related task and define measurable or observable outcomes. After an individual completes all coursework and requisite requirements, the certification task book process verifies completion of job performance requirements.

## **Content**

In addition to the individual certification training standards, the CTS guide also includes State Fire Training Revisions and Errata pages.

### **State Fire Training Content**

Located at the back of the CTS guide, this table documents any significant revisions made by State Fire Training to the NFPA standards in the development of this CTS guide. This table is used to justify content additions and advise the course plan development team.

### **Errata**

Located at the back of the CTS guide, this page documents any changes made to the CTS guide outside of the five-year NFPA revision cycle.

# Fire Apparatus Driver/Operator – Tillered Apparatus

## Section 1: Operations

### 1-1: Perform the Practical Driving Exercises

#### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 7.2.1
- Paragraph 7.2.2

Office of the State Fire Marshal

#### Given

1. Aerial apparatus equipped with a tiller
2. Qualified driver/*operator*
3. Spotter
4. *Manufacturer's specifications and requirements*
5. *Policies and procedures of the jurisdiction*

#### Requisite Knowledge and Skills

1. *Discuss* principles of tiller operations
2. *Describe the tiller operator's responsibility*
3. *Identify the* methods of communication with the *apparatus driver/operator*
4. *Explain the* effects on tiller control of general steering reactions
5. *Describe* manufacturer operation limitations
6. Determine a correct position for the tiller
7. Maneuver the tiller into the correct position
8. Operate the communication system between the tiller operator's position and the driver's compartment
9. Avoid obstacles to operations

#### Job Performance Requirements

Perform the practical driving exercises specified in NFPA 1002 Paragraphs 4.3.2 through 4.3.5 without striking the apparatus or obstructions.

## **1-2: Operate a Tillered Apparatus**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 7.2.2

### **Given**

1. Aerial apparatus equipped with a tiller
2. Qualified driver/*operator*
3. Spotter
4. *Predetermined route on a public way*

### **Requisite Knowledge and Skills**

1. *Explain* the effects on tiller control during night driving and negotiating intersections
2. Operate the communication system between the tiller operator's position and the driver's compartment
3. Operate passenger restraint devices
4. Maintain control of the tiller while accelerating, decelerating, and turning
5. Operate the tiller during nonemergency conditions
6. Operate under adverse environmental or driving surface conditions

### **Job Performance Requirements**

Operate an aerial apparatus equipped with a tiller over a predetermined route on a public way using the maneuvers specified in Paragraph 4.3.1 while in compliance with all applicable state and local laws, and policies and procedures of the jurisdiction.

### **1-3: Position and Stabilize a Tillered Apparatus**

#### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 7.2.3

#### **Given**

1. *Aerial apparatus equipped with a tiller*
2. *Qualified driver/operator*
3. Incident location
4. Situation description
5. Assignment

#### **Requisite Knowledge and Skills**

1. *Explain* the principles of positioning and stabilizing an aerial apparatus
2. Determine a correct position for the tiller
3. Maneuver the tiller into the correct position
4. Avoid obstacles to operations

#### **Job Performance Requirements**

Position and stabilize a fire department aerial apparatus equipped with a tiller.

## State Fire Training Content

**Code Key**

**Blocks**

- G = Given
- RKS = Requisite Knowledge and Skills
- JPR = Job Performance Requirements
- NCTS = New certification training standard

**Sources**

- [ACRONYM = Title]
- [ACRONYM = Title]
- [ACRONYM = Title]

### Certification: Fire Apparatus Driver/Operator – Tillered Apparatus

CTS	Block	Addition	Justification	Source/Reference
1-1	G	Manufacturer’s specifications and requirements		
1-1	G	Policies and procedures of the jurisdiction		
1-1	RKS	Describe the tiller operator’s responsibility		
1-2	G	Predetermined route on a public way		
1-3	G	Aerial apparatus equipped with a tiller		
1-3	G	Qualified driver/operator		



# Tillered Apparatus Operations

## Course Plan

### Course Details

- Certification:** Fire Apparatus Driver/Operator – Tillered Apparatus
- CTS Guide:** Fire Apparatus Driver/Operator (Month 2015)
- Description:** This course provides information on operating a fire department aerial apparatus equipped with a tiller. Topics include practical driving exercises; and operating, positioning, and stabilizing the apparatus from both the tractor and tiller positions. This course is based on the 2014 edition of *NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications*.
- Designed For:** Career and volunteer fire service personnel who drive and operate a tillered apparatus
- Prerequisites:** Successfully completed OSFM Fire Fighter I training  
Successfully completed Fire Apparatus Driver/Operator 1A  
Hold a valid Class C Firefighter Endorsed driver's license (minimum)
- Standard:** Complete all activities and skills  
Complete the summative test with a minimum score of 80%
- Hours:**
- |             |       |
|-------------|-------|
| Lecture:    | 11:00 |
| Activities: | 1:00  |
| Skills:     | 27:00 |
| Testing:    | 1:00  |
- Hours (Total):** 40:00
- Maximum Class Size:** 30
- Instructor Level:** This courses requires one (1) primary instructor and sufficient assistant instructors to meet the skills ratio
- Instructor/Student Ratio:** Lecture: 1:30 Skills: 1:10

## Tillered Apparatus

---

**Restrictions:** Sufficient fire apparatus and adequate space to accommodate the students in the class and the required skills

**SFT Designation:** CFSTES

### Required Resources

#### Instructor Resources

To teach this course, instructors need:

- *Fire Apparatus Driver/Operator*, Second Edition, Jones & Bartlett, ISBN-13: 978-1-284-02691-7
- Manufacturer's specifications and requirements

#### Online Instructor Resources

The following instructor resources are available online at

<http://osfm.fire.ca.gov/training/instructorscorner.php>:

- Tillered Apparatus Operations Required Activities

#### Student Resources

To participate in this course, students need:

- *Fire Apparatus Driver/Operator*, Second Edition, Jones & Bartlett, ISBN-13: 978-1-284-02691-7
- Personal protective clothing

#### 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 aerial apparatus equipped with a tiller to accommodate the students in the class
- Qualified fire apparatus driver/operator
- Spotter
- Tape measure
- Delineators
- Traffic cones
- Vertical obstacle
- Left front tire marker

## Tillered Apparatus

---

- Optional straight line marker
- Adequate space to accommodate required skills

DRAFT

### 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, 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
  - Required student resources
  - Class participation requirements

##### Discussion Questions

1. What is a formative test? What is a summative test?

##### Activities

1. To be determined by the instructor.

#### Topic 1-2: Fire Apparatus Driver/Operator – Tillered Apparatus Certification Process

##### Terminal Learning Objective

At the end of this topic, a student will be able to identify the courses and requirements for the Fire Apparatus Driver/Operator – Tillered Apparatus certification, and be able to describe the certification task book and testing process.

## Tillered Apparatus

---

### Enabling Learning Objectives

1. Identify the courses required for Fire Apparatus Driver/Operator – Tillered Apparatus
  - Driver/Operator
  - Tillered Apparatus Operations
2. Identify any other requirements for Fire Apparatus Driver/Operator – Tillered Apparatus certification
  - OSFM certified Fire Fighter I
  - Experience [one (1) of the following two (2) options]
    - Option 1: Have a minimum of one (1) year full-time, paid experience in a California fire department with the primary responsibility of operating a tillered apparatus
    - Option 2: Have a minimum of two (2) years volunteer or part-time, paid experience in a California fire department with the primary responsibility of operating a tillered apparatus
  - Be appointed to the rank or position of Fire Apparatus Driver/Operator
    - Performing in an acting capacity does not qualify
3. Describe the certification task book process
  - Complete all prerequisites and course work
  - Submit application and fees to request certification task book
  - Complete all job performance requirements included in the task book
  - Must have identified evaluator verify individual task completion via signature
  - Must have Fire Chief or authorized representative verify task book completion via signature
  - Must be employed by a California Fire Agency in the position prior to submitting completed task book to State Fire Training
4. Describe the certification testing process
  - Complete course work
  - Schedule online certification test
  - Schedule skills evaluation test

### Discussion Questions

1. How many courses are there in the Fire Apparatus Driver/Operator – Tillered Apparatus certification track? What are they?

### Activities

1. To be determined by the instructor.

## Unit 2: Operations

### Topic 2-1: Perform the Practical Driving Exercises

#### Terminal Learning Objective

At the end of this topic, a student, given an aerial apparatus equipped with a tiller, qualified tillered apparatus driver/operator, spotter, manufacturer's specifications and requirements,

## Tillered Apparatus

---

and policies and procedures of the jurisdiction, will be able to perform the practical driving exercises specified in NFPA 1002 Paragraphs 4.3.2 through 4.3.5 without striking the apparatus or obstructions.

### Enabling Learning Objectives

1. Discuss the principles of tiller operations
  - From tractor position
  - From tiller box position
2. Describe the tiller operator's responsibility
3. Identify the methods of communication with the apparatus driver/operator
4. Explain the effects on tiller control of general steering reactions
  - From tractor position
  - From tiller box position
5. Describe manufacturer's operation limitations
6. Determine a correct position for the tiller
7. Maneuver the tiller into the correct position
8. Communicate with the apparatus driver/operator
9. Avoid obstacles to operations

### Discussion Questions

1. What is your objective when steering?
2. How does the responsibility of the tiller operator differ from the apparatus driver/operator?
3. How do the tiller operator's movements affect the apparatus driver/operator's control of the apparatus?
4. How many rotations of the tiller steering wheel to the left or right before reaching the stop?
5. Who is responsible for backing?
6. While backing, where should you position your hands on the steering wheel?
7. When should you communicate?

### Activities

1. Activity 2-1-1: Serpentine
2. Activity 2-1-2: Cul-de-sac Turnaround
3. Activity 2-1-3: Station Parking
4. Activity 2-1-4: Diminishing Clearance

### Instructor Note:

1. Personnel being trained in the tiller box should also have the opportunity to operate the tractor.

**CTS Guide Reference:** CTS 1-1

## Topic 2-2: Operate a Tillered Apparatus

### Terminal Learning Objective

At the end of this topic, a student, given an aerial apparatus equipped with a tiller, qualified tillered apparatus driver/operator, spotter, and a predetermined route on a public way, will

## Tillered Apparatus

---

be able to operate an aerial apparatus equipped with a tiller over a predetermined route on a public way using the maneuvers specified in Paragraph 4.3.1 while in compliance with all applicable state and local laws, and policies and procedures of the jurisdiction.

### Enabling Learning Objectives

1. Explain the effects on tiller control during night driving and negotiating intersections
2. Operate the communication systems between the tiller operator's position and the driver's compartment
3. Operate passenger restraint devices
4. Maintain control of the tillered apparatus while accelerating, decelerating, and turning
5. Operate the tillered apparatus during nonemergency conditions
6. Operate under adverse environmental or driving surface conditions

### Discussion Questions

1. What are your considerations when negotiating intersections?
2. What should be some of your concerns when operating on a roadway?
3. How do you align the tractor and trailer when operating at night?
4. How do you communicate to the apparatus driver/operator that you need to stop?

### Activities

1. Divide students into small groups. Have each group review a tillered apparatus accident and develop recommendations for preventing a reoccurrence? Have each group present their findings.

**CTS Guide Reference:** CTS 1-2

## Topic 2-3: Position and Stabilize a Tillered Apparatus

### Terminal Learning Objective

At the end of this topic, a student, given an aerial apparatus equipped with a tiller, qualified tillered apparatus driver/operator, incident location, situation description, and assignment, will be able to position and stabilize an aerial apparatus equipped with a tiller.

### Enabling Learning Objectives

1. Explain the principles of positioning and stabilizing an aerial apparatus
2. Determine a correct position for the tiller
3. Maneuver the tiller into the correct position
4. Avoid obstacles to operations

### Discussion Questions

1. When would you angle the trailer out?
2. When do you leave the tiller box after arriving on-scene?
3. What responsibility does the tiller operator have for stabilizing the apparatus?

### Activities

1. Activity 2-3-1: Position and Stabilize a Tillered Apparatus

**CTS Guide Reference:** CTS 1-3

## Tillered Apparatus

### Time Table

Segment	Lecture Time	Activity/Skills Time	Total Unit Time
<b>Unit 1: Introduction</b>			
Topic 1-1: Orientation and Administration			
Lecture	0:30		
To be determined by instructor			
Topic 1-2: Tillered Apparatus Certification Process			
Lecture	0:30		
To be determined by instructor			
<b>Unit 1 Totals</b>	<b>1:00</b>	<b>0:00</b>	<b>1:00</b>
<b>Unit 2: Operations</b>			
Topic 2-1: Perform the Practical Driving Exercises			
Lecture	8:00		
Activity 2-1-1: Serpentine		*	
Activity 2-1-2: Cul-de-sac Turnaround		*	
Activity 2-1-3: Station Parking		*	
Activity 2-1-4: Diminishing Clearance		*	
Topic 2-2: Operate a Tillered Apparatus			
Lecture	1:00		
Recommended activity		1:00	
Topic 2-3: Position and Stabilize a Tillered Apparatus			
Lecture	1:00		
Activity 2-3-1: Position and Stabilize a Tillered Apparatus		*	
<b>Unit 2 Totals</b>	<b>10:00</b>	<b>28:00</b>	<b>38:00</b>
<b>Lecture, Activity, and Unit Totals:</b>	<b>11:00</b>	<b>28:00</b>	<b>39:00</b>

#### Course Totals

Total Lecture Time (LT)	11:00
Total Activity Time (AT)	1:00
Total Skills Time (ST)	*27:00
Total Testing Time (TT)	1:00
<b>Total Course Time</b>	<b>40:00</b>

Note: Skills time will vary depending on the number of students in the program. It is important to remember that the suggested skill hours are for 30 students.

# Tillered Apparatus Operations

## Activity 2-1-1: Serpentine

---

### Serpentine Exercise

#### Skill 2-1-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 7.2.1**

Perform the practical driving exercises specified in 4.3.2 through 4.3.5 from the tiller position, given a qualified driver, a fire department aerial apparatus equipped with a tiller, and a spotter for backing up, so that each exercise is performed without striking the vehicle or obstructions.

**Format:** Individual

**Time Frame:** Open (based on a total of 28:00 hours for skills practice and completion)

#### **Description**

This exercise measures a driver/operator's ability to perform the practical driving exercises specified in NFPA 1002 Paragraphs 4.3.2 through 4.3.5 from the tiller position without striking the vehicle or obstructions.

#### **Materials**

- Tillered apparatus
- Qualified tillered apparatus driver/operator
- Tape measure
- Three (3) delineators

#### **Instructor Notes**

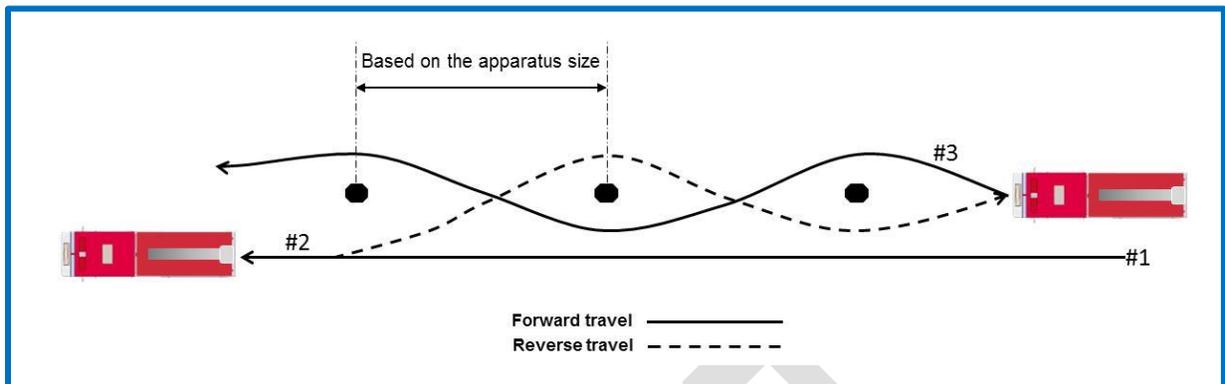
1. This skill identified under JPR 7.2.1 shall be demonstrated prior to the students practicing and completing each skill.
2. Establish the course or path of travel for this exercise by placing a minimum of three delineators in a straight line.
  - The spacing of the delineators is based on the apparatus being used.
3. Provide adequate space on each side of the delineators for the apparatus to move freely.
4. The driver/operator and tiller operator drive the apparatus along the left side of the markers in a straight line and the driver/operator stops when the rear of the apparatus is just beyond the last delineator.
5. The driver/operator and tiller operator then begin the exercise by backing the apparatus between the delineators, by passing to the left of delineator #1, to the right of delineator #2, and to the left of delineator #3.
6. At this point, the driver/operator stops the apparatus when the front of the apparatus is just beyond delineator #3.

# Tillered Apparatus Operations

## Activity 2-1-1: Serpentine

---

### Activity Illustration



## Tillered Apparatus Operations

### Activity 2-1-2: Cul-de-sac Turnaround

---

## Cul-de-sac Turnaround

### Skill 2-1-2

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 7.2.1**

Perform the practical driving exercises specified in 4.3.2 through 4.3.5 from the tiller position, given a qualified driver, a fire department aerial apparatus equipped with a tiller, and a spotter for backing up, so that each exercise is performed without striking the vehicle or obstructions.

**Format:** Individual

**Time Frame:** Open (based on a total of 28:00 hours for skills practice and completion)

#### **Description**

This exercise measures the tiller operator's ability to turn the apparatus around in a cul-de-sac without striking obstacles.

#### **Materials**

- Tillered apparatus
- Qualified tillered apparatus driver/operator
- Tape measure
- Two (2) delineators
- Traffic cones

#### **Instructor Notes**

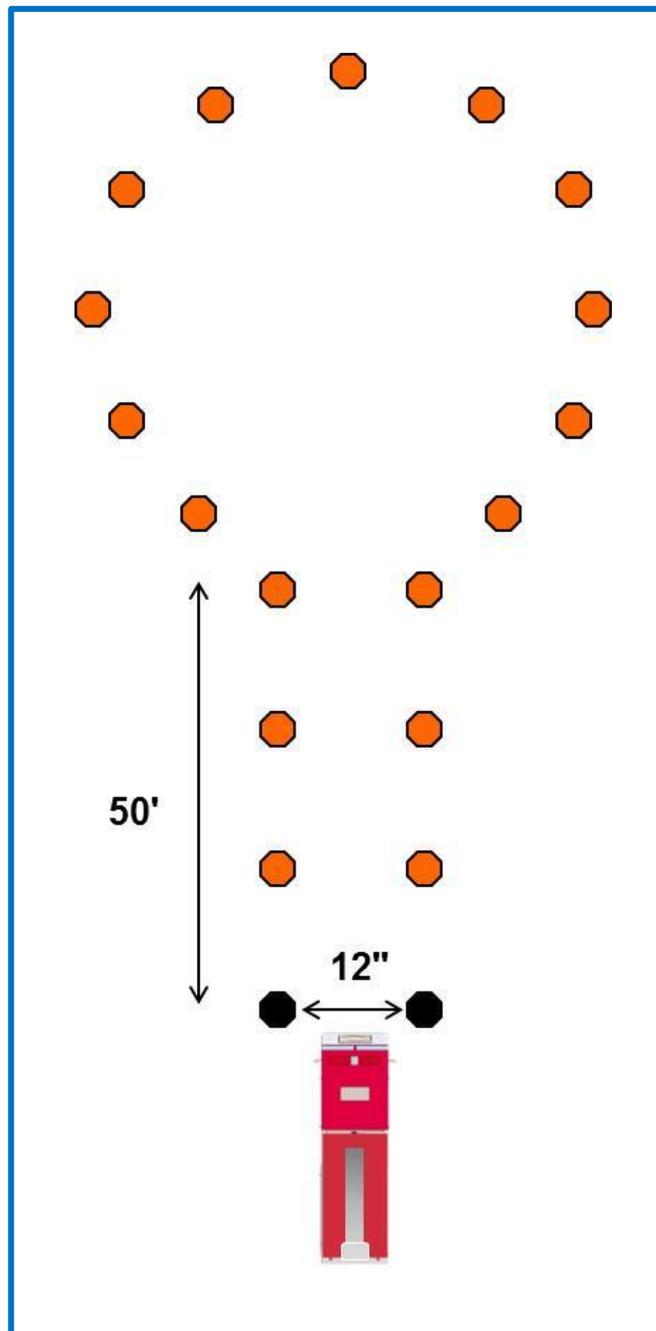
1. Establish a 50-foot lane, 12-feet wide.
2. Establish a cul-de-sac at one end with a diameter that is the length of the apparatus being used plus two times the width.
3. The driver/operator and tiller operator enter into the cul-de-sac through the 12-foot lane, turn the apparatus 180 degrees, and return through the lane in one continuous maneuver.

# Tillered Apparatus Operations

## Activity 2-1-2: Cul-de-sac Turnaround

---

### Activity Illustration



# Tillered Apparatus Operations

## Activity 2-1-3: Station Parking

---

### Station Parking

#### Skill 2-1-3

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 7.2.1**

Perform the practical driving exercises specified in 4.3.2 through 4.3.5 from the tiller position, given a qualified driver, a fire department aerial apparatus equipped with a tiller, and a spotter for backing up, so that each exercise is performed without striking the vehicle or obstructions.

**Format:** Individual

**Time Frame:** Open (based on a total of 28:00 hours for skills practice and completion)

#### **Description**

This exercise measures the driver/operator's and tiller operator's ability to back the apparatus into an apparatus bay.

#### **Materials**

- Tillered apparatus
- Qualified tillered apparatus driver/operator
- Tape measure
- Traffic cones
- Nine (9) delineators
- Left front tire marker
- Optional straight line marker
- Extra traffic cones and delineators available

#### **Instructions**

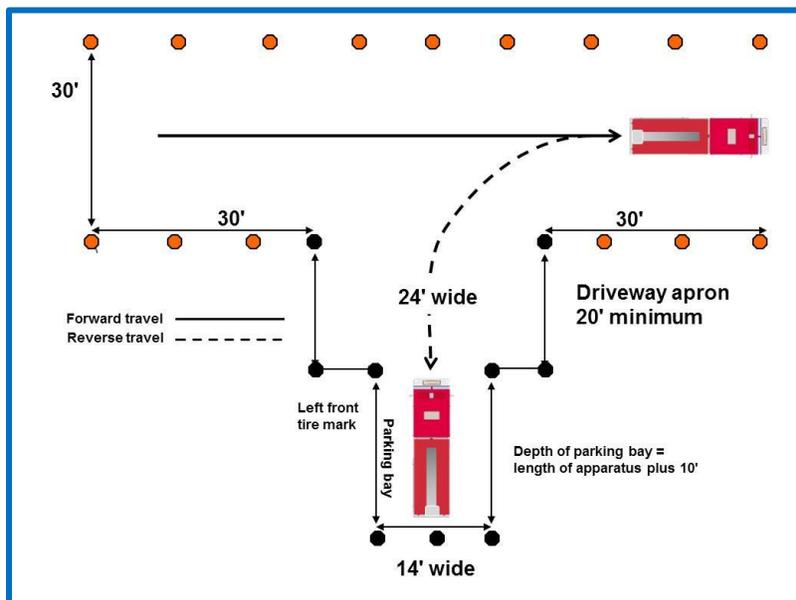
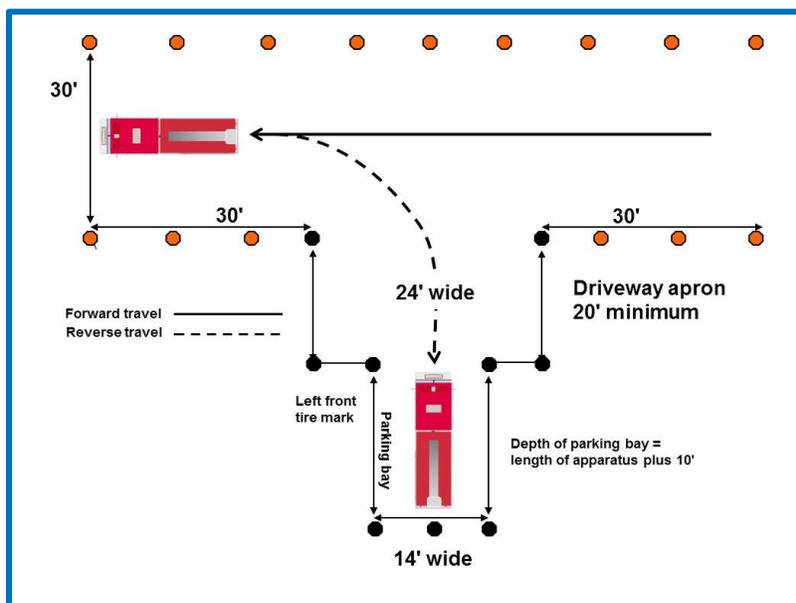
1. Establish two boundary lines 30 feet apart using traffic cones to simulate a street.
2. Simulate a driveway apron by arranging four (4) delineators off one boundary line, 24 feet wide, and a minimum of 20 feet long.
  - The instructor can increase or decrease the size of the driveway apron based on the needs of the jurisdiction.
3. Place traffic cones on each side of the driveway apron between the delineators.
4. Simulate the entrance to the apparatus bay by placing two (2) delineators 14 feet apart.
5. Place three (3) delineators at the back of the apparatus bay. This depth is determined by the length of the tillered aerial apparatus plus 10 feet.
6. Place traffic cones on each side of the apparatus bay between the delineators.

## Tillered Apparatus Operations

### Activity 2-1-3: Station Parking

7. Place a marker on the ground to indicate to the driver/operator the proper position of the left front tire of the apparatus once stopped and parked.
8. An optional straight line can be placed on the floor of the apparatus bay to assist the driver/operator while backing the apparatus, facilitating the use of apparatus mirrors.
9. The driver/operator and tiller operator pass the delineators identifying the driveway apron on the left and then back the apparatus, using a left turn, into the apparatus bay.
10. Repeat the exercise with the driveway apron on the right side, using a right turn.
11. Activity is completed once the apparatus has backed into the bay from both directions and driven onto the roadway in both directions.

### Activity Illustrations



## Tillered Apparatus Operations

### Activity 2-1-4: Diminishing Clearance

---

## Diminishing Clearance

### Activity 2-1-4

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 7.2.1**

Perform the practical driving exercises specified in 4.3.2 through 4.3.5 from the tiller position, given a qualified driver, a fire department aerial apparatus equipped with a tiller, and a spotter for backing up, so that each exercise is performed without striking the vehicle or obstructions.

**Format:** Individual

**Time Frame:** Open (based on a total of 28:00 hours for skills practice and completion)

#### **Description**

This exercise measures a driver/operator's and tiller operator's ability to steer the apparatus in a straight line, judge distances from wheel to object, and stop at a finish line. The driver/operator's speed should be great enough to necessitate quick judgment.

#### **Materials**

- Tillered apparatus
- Qualified tillered apparatus driver/operator
- Tape measure
- Traffic cones
- Four (4) delineators
- Vertical obstacle

#### **Instructor Notes**

1. This skill identified under JPR 7.2.1 shall be demonstrated prior to the students practicing and completing each skill.
2. Establish a 100-foot lane using traffic cones.
3. The lane varies in width from 10 feet to a diminishing clearance that is 2 inches greater than the outside dimension of the tires on the apparatus being used.
4. Establish a finish line 75 feet past the end of the lane using traffic cones and at least one (1) delineator.
5. Establish at least one (1) adjustable vertical obstacle in the lane.
6. The driver/operator and tiller operator maneuver the apparatus through this lane.
  - If the tiller operator determines the apparatus cannot clear the vertical obstacle, he or she should communicate to the driver/operator to stop the apparatus.

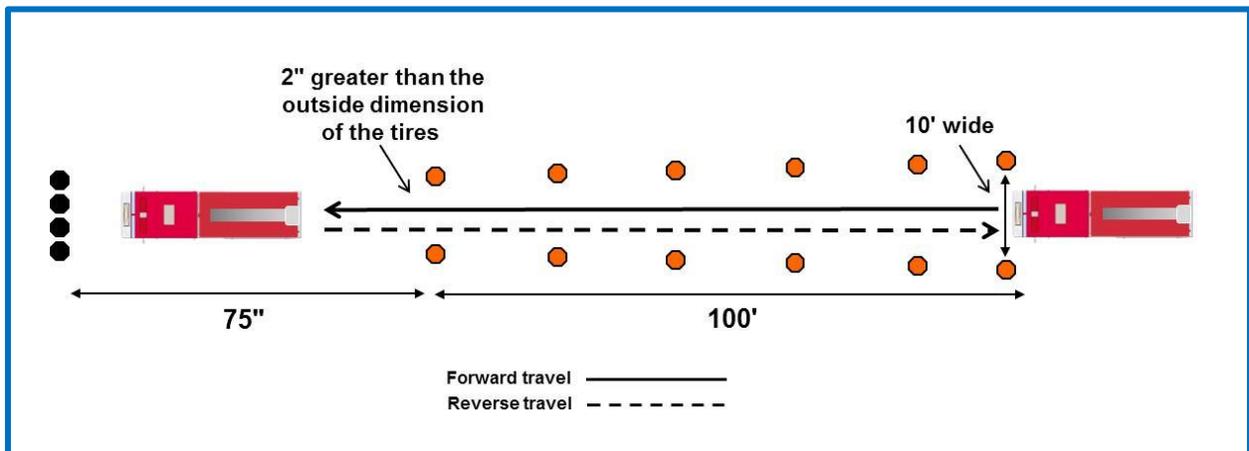
## Tillered Apparatus Operations

### Activity 2-1-4: Diminishing Clearance

---

7. The driver/operator stops the apparatus at the finish line with no portion of the apparatus protruding beyond the finish line.
8. The driver/operator and tiller operator drives back through the lane.
  - If the tiller operator determines the apparatus cannot clear the vertical obstacle, he or she should communicate to the driver/operator to stop the apparatus.
9. The driver/operator stops after the front of the apparatus passes the last traffic cone.

### Activity Illustration



## Tillered Apparatus Operations

### Activity 2-3-1: Position and Stabilize a Tillered Apparatus

---

## Position and Stabilize a Tillered Apparatus

### Activity 2-3-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 7.2.3**

Position a fire department aerial apparatus equipped with a tiller from the tiller position, given the apparatus operating instructions, an incident location, a situation description, and an assignment, so that the aerial device is positioned and stabilized to accomplish the assignment.

**Format:** Individual

**Time Frame:** Open (based on a total of 17:00 hours for skills practice and completion)

#### **Description**

This activity provides students with an opportunity to practice the job performance requirement to position and stabilize a tillered apparatus.

#### **Materials**

- Tillered apparatus
- Qualified tillered apparatus driver/operator
- Facility and/or location with space sufficient to accommodate operating the apparatus
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 7.2.3 shall be demonstrated prior to the students practicing and completing each skill.

# Fire Apparatus Driver/Operator – Wildland Fire Apparatus

---

## Certification Training Standards Guide [Month 2015]



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

# Fire Apparatus Driver/Operator – Wildland Fire Apparatus

## Certification Training Standards Guide [Month 2015]

This CTS guide utilizes NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014) to provide the qualifications for State Fire Training's Fire Apparatus Driver/Operator – Wildland Fire Apparatus certification.

State Fire Training coordinated the development of this CTS guide. Before its publication, the Statewide Training and Education Advisory Committee (STEAC) and the State Board of Fire Services (SBFS) recommended this CTS guide for adoption by the Office of the State Fire Marshal (OSFM).

**CALIFORNIA  
STATE FIRE**



**TRAINING**

Published by State Fire Training  
1131 S Street, Sacramento, CA 95811  
(916) 445-8200

Cover photo courtesy of [Ann Rosales, CalFire]

# Table of Contents

State Fire Training .....	1
Acknowledgments.....	2
How to Read a CTS Guide.....	5
Fire Apparatus Driver/Operator – Wildland Fire Apparatus .....	7
Section 1: Preventive Maintenance .....	7
1-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to a Wildland Fire Apparatus .....	7
Section 2: Operations.....	8
2-1: Operate a Wildland Fire Apparatus .....	8
2-2: Produce an Effective Fire Stream.....	9
State Fire Training Content.....	10

# State Fire Training

## Mission

To enable the California Fire Service to safely protect life and property through education, training, and certification.

## The California Fire Services 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.

CFSTES facilitates, coordinates, and assists in the development and implementation of standards and certification for the California fire service. CFSTES:

1. Administers the California Fire Academy System
2. Provides accredited courses leading to certification and approved standardized training programs for local and regional delivery
3. Administers the national accreditation process in California
4. Publishes certification training standards, course plans, and a certification task book for each certified level in the California fire service

CFSTES is a fire service system developed by the fire service, for the fire service. It is only as successful and effective as the people involved in it.

## Acknowledgments

State Fire Training appreciates the hard work and accomplishments of those who built the solid foundation on which this program continues to grow.

State Fire Training gratefully acknowledges the following individuals and organizations for their diligent efforts and contributions that made the development and publication of this document possible.

### CAL FIRE

**Ken Pimlott**  
*Director, CAL FIRE*

**Tonya Hoover**  
*State Fire Marshal*

**Mike Richwine**  
*Assistant State Fire Marshal*

**Vacant**  
*Chief, State Fire Training*

**Ron Coleman**  
*Chair, STEAC*

### Cadre Leadership

**Mark Romer**  
*Cadre Leader*  
*Fire Service Training Specialist III, Office of the State Fire Marshal*

**Alicia Hamilton**  
*Cadre Editor*  
*Sacramento State*

### Cadre Members

**Jonathan Black**  
*Captain, Santa Clara County Fire Department*  
*Development and Validation Cadre*

## Acknowledgments

---

**Bruce Fosdike**

*Captain, CAL FIRE (Retired), San Luis Obispo Unit  
Development Cadre*

**Daniel Hoy**

*Engineer, Sacramento Metropolitan Fire District  
Development Cadre*

**Timothy McIntyre**

*Engineer, Los Angeles County Fire Department  
Development and Validation Cadre*

**Drew Oliphant**

*Engineer, Los Angeles Fire Department  
Development and Validation Cadre*

**Ann Johnston Rosales**

*Battalion Chief, CAL FIRE/Fire Academy  
Development and Validation Cadre*

**Steve Walton**

*Engineer, Larkspur Fire Department  
Development Cadre*

**Karen Wilson**

*Lieutenant, Mariposa County Fire Department  
Development and Validation Cadre*

## Validation Members

**Craig Berchtold**

*Engineer, Livermore-Pleasanton Fire Department  
Validation Cadre*

**Bret Black**

*Captain, Clovis Fire Department  
Validation Cadre*

**Steve Castagnola**

*Engineer, San Bernardino County Fire Department  
Validation Cadre*

## Acknowledgments

---

**Boyd Clegg**

*Assistant Chief, Vacaville Fire Protection District  
Validation Cadre*

**Jim Colston**

*Captain, San Marcos Fire Department  
Validation Cadre*

**DeWayne Felkins**

*Captain, Sacramento Fire Department  
Validation Cadre*

**John Malone**

*Captain, Dixon Fire Department  
Validation Cadre*

**Kelly Tassone**

*Captain (Retired), Sacramento Metropolitan Fire District  
Validation Cadre*

**Tanisha Tucker**

*Engineer, Oakland Fire Department  
Validation Cadre*

## Partners

State Fire Training also extends special acknowledgement and appreciation to the Conference and Training Services Unit with the College of Continuing Education at California State University, Sacramento, for its ongoing meeting logistics and curriculum development support, innovative ideas, and forward-thinking services. This collaboration is made possible through an interagency agreement between CAL FIRE and Sacramento State.

## How to Read a CTS Guide

State Fire Training develops a Certification Training Standards (CTS) Guide for a variety of job functions in the fire service such as firefighter, driver/operator, fire instructor, and company officer. The CTS guide lists the requisite knowledge and skills and the job performance requirements a person is expected to complete in order to become certified in a specific function. CTS guides are appropriate for fire service personnel and individuals in related occupations pursuing State Fire Training certification.

Each CTS guide serves as a foundation for the certification programs recommended for adoption by the Office of the State Fire Marshal. Any certification program must be based on job-related knowledge and measurable performance standards. To master the knowledge and skills needed for specialized operations, individuals will require additional training to augment the performance standards included in the CTS guide.

Within the CTS guide, it is impossible to capture the different policies and procedures of each organization in the California fire service. Individuals aspiring to meet State Fire Training's certification training standards must do so in accordance with the codes, standards, regulations, policies, and standard operating procedures applicable within their own departments or jurisdictions.

### Format

Each certification training standard included in the CTS guide includes the following:

#### Section Heading

The section heading describes a general category for a group of training standards. For example, the Fire Marshal CTS includes the following sections: Administration, Risk Management, Community Relations, Professional Development, Regulatory Programs, Fire and Life Safety, and Investigation. Each section contains one or more individual training standards.

#### Training Standard Title

The training standard title provides a general description of the performance requirement contained within the standard.

#### Authority

The CTS guide references each standard with one or more paragraphs of the corresponding National Fire Protection Association (NFPA) Professional Qualifications. This ensures that each fire service function within California's certification system meets or exceeds NFPA standards.

When California requirements exceed the NFPA standard, the CTS guide cites the Office of the State Fire Marshal as the authority and prints the corresponding information in *italics*.

### **Given**

This section lists the objects, equipment, materials, or facilities an individual needs in order to acquire the requisite knowledge and skills or to accomplish the job performance requirement(s) within a training standard.

### **Requisite Knowledge and Skills**

This section lists the knowledge and skills that an individual must acquire in order to accomplish the job performance requirement(s) within a training standard.

This section does not include NFPA requisite knowledge or skills that are too general to teach or that individuals should develop through life experiences. For example, a training standard would not list “communicate orally and in writing” or “ability to relate interpersonally” unless they specifically apply to a job performance requirement about acquiring communication skills or developing interpersonal relationships.

### **Job Performance Requirements**

This section includes one or more written statements that describe a specific job-related task and define measurable or observable outcomes. After an individual completes all coursework and requisite requirements, the certification task book process verifies completion of job performance requirements.

## **Content**

In addition to the individual certification training standards, the CTS guide also includes State Fire Training Revisions and Errata pages.

### **State Fire Training Content**

Located at the back of the CTS guide, this table documents any significant revisions made by State Fire Training to the NFPA standards in the development of this CTS guide. This table is used to justify content additions and advise the course plan development team.

### **Errata**

Located at the back of the CTS guide, this page documents any changes made to the CTS guide outside of the five-year NFPA revision cycle.

# Fire Apparatus Driver/Operator – Wildland Fire Apparatus

## Section 1: Preventive Maintenance

### 1-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to a Wildland Fire Apparatus

#### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 8.1.1

Office of the State Fire Marshal

#### Given

1. Wildland fire apparatus
2. *Tools and equipment*
3. Manufacturer's specifications *and requirements*
4. *Maintenance and inspection forms*
5. Policies and procedures of the jurisdiction

#### Requisite Knowledge and Skills

1. *Explain* manufacturer's specifications and requirements
2. *Discuss* the policies and procedures of the jurisdiction, *including documentation requirements*
3. *Describe* wildland fire apparatus systems and components
4. *Discuss* inspection requirements when transitioning from off-road to on-road operations
5. *Inspect* a wildland fire apparatus
6. Use tools *and equipment*
7. Recognize system problems and out-of service criteria
8. Correct any deficiency noted according to policies and procedures *and/or manufacturer specifications and requirements*

#### Job Performance Requirements

Perform and document routine tests, inspections, and servicing functions on the systems and components unique to wildland fire apparatus, in addition to those in NFPA 1002 Paragraph 4.2.1, to verify their operational status.

## Section 2: Operations

### 2-1: Operate a Wildland Fire Apparatus

#### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 8.1.2

Office of the State Fire Marshal

#### Given

1. Wildland fire apparatus
2. *Applicable laws and regulations*
3. *Policies and procedures of the jurisdiction*
4. Predetermined route off of a public way that incorporates the maneuvers and features that the driver/operator is expected to encounter during normal operations

#### Requisite Knowledge and Skills

1. *Recognize wildland fire apparatus resource typing*
2. *Explain* the effects on vehicle control of braking reaction time and load factors
3. *Explain* the effects of high center of gravity on roll-over potential, general steering reactions, speed, and centrifugal force
4. *Discuss* applicable laws and regulations
5. *Review policies and procedures of the jurisdiction*
6. *Describe* the principles of skid avoidance, night driving, shifting, and gear patterns
7. *Discuss* negotiating intersections, railroad crossings, and bridges
8. *Describe* weight and height limitations for both roads and bridges
9. *Describe* automotive gauges and their operation
10. *Explain* operational limits
11. *Discuss off-road wildland fire apparatus emergencies*
12. Operate passenger restraint devices
13. Maintain safe following distances
14. Maintain control of the *wildland fire apparatus* while accelerating, decelerating, and turning, given road, weather, and traffic conditions
15. Operate the *wildland fire apparatus* under adverse environmental or driving surface conditions
16. Use automotive gauges and controls

#### Job Performance Requirements

Operate a wildland fire apparatus in compliance with all applicable jurisdictional rules and regulations and operational limitations of the apparatus.

## 2-2: Produce an Effective Fire Stream

### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 8.2.1

Office of the State Fire Marshal

### Given

1. *Wildland fire apparatus*
2. Water tank
3. Pressurized *water* source
4. Static *water* source

### Requisite Knowledge and Skills

1. *Explain* hydraulic calculations for friction loss and flow using both written formulas and estimation methods
2. *Describe the* safe operation of the pump
3. *Discuss* correct apparatus placement
4. *Describe* personal safety considerations
5. *Discuss* the reliability of static *water* sources
6. *Discuss mobile attack operations*
7. Position a wildland fire apparatus to operate at a fire hydrant and at a static water source
8. *Position* apparatus for fire attack
9. Transfer power from vehicle engine to pump
10. Draft
11. Operate pumper pressure control systems
12. Operate the volume/pressure transfer valve (multistage pumps only)
13. Operate auxiliary cooling systems
14. Make the transition between internal and external water sources
15. Assemble hose lines, nozzles, valves, and appliances

### Job Performance Requirements

Produce an effective fire stream by engaging the pump, setting all pressure control and vehicle safety devices, and achieving the rated flow of the nozzle while monitoring the apparatus for potential problems.

## State Fire Training Content

**Code Key**

**Blocks**

- G = Given
- RKS = Requisite Knowledge and Skills
- JPR = Job Performance Requirements
- NCTS = New certification training standard

**Sources**

- [ACRONYM = Title]
- [ACRONYM = Title]
- [ACRONYM = Title]

### Certification: [Certification Title]

CTS	Block	Addition	Justification	Source/Reference
1-1	G	Tools and equipment	[Text]	[Text]
1-1	G	Maintenance and inspection forms		
1-1	RKS	Describe wildland fire apparatus systems and components		
1-1	RKS	Discuss inspection requirements when transitioning from off-road to on-road operations		
1-1	RKS	Inspect a wildland fire apparatus		
2-1	G	Applicable laws and regulations		
2-1	RKS	Recognize wildland fire apparatus resource typing		
2-1	RKS	Review policies and procedures of the jurisdiction		
2-1	RKS	Discuss off-road wildland fire apparatus emergencies		
2-2	G	Wildland fire apparatus		

## Errata

---

CTS	Block	Addition	Justification	Source/Reference
2-2	RKS	Discuss mobile attack operations		



# Wildland Fire Apparatus Operations

## Course Plan

### Course Details

<b>Certification:</b>	Fire Apparatus Driver/Operator – Wildland Fire Apparatus
<b>CTS Guide:</b>	Fire Apparatus Driver/Operator (Month 2015)
<b>Description:</b>	This course provides information on preventive maintenance and operation of a wildland fire apparatus. Topics include routine tests, inspections, and servicing functions on the systems and components unique to wildland fire apparatus; operating a wildland fire apparatus and producing an effective fire stream. This course is based on the 2014 edition of <i>NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications</i> .
<b>Designed For:</b>	Career and volunteer fire service personnel who drive and operate a wildland fire apparatus
<b>Prerequisites:</b>	Hold a valid Class C Firefighter Endorsed driver's license (minimum) Successfully completed OSFM Fire Fighter I training Successfully completed Fire Apparatus Driver/Operator 1A Successfully completed Fire Apparatus Driver/Operator 1B Completed a minimum of four (4) hours driving a wildland fire apparatus Completed the activities from Driver/Operator 1A while driving a wildland fire apparatus
<b>Standard:</b>	Complete all activities and skills  Complete the summative test with a minimum score of 80%
<b>Hours:</b>	Lecture: 4:30 Activities: 1:30 Skills: 17:00 Testing: 1:00
<b>Hours (Total):</b>	24:00
<b>Maximum Class Size:</b>	30

# Wildland Fire Apparatus Operations

---

**Instructor Level:** This course requires one (1) primary instructor and sufficient assistant instructors to meet the skills ratio

**Instructor/Student Ratio:** Lecture: 1:30 Skills: 1:10

**Restrictions:** Sufficient fire apparatus and adequate space to accommodate the students in the class and the required skills

**SFT Designation:** CFSTES

## Required Resources

### Instructor Resources

To teach this course, instructors need:

- **Title, #** Edition, Jones & Bartlett, ISBN-#:
- **Supplemental off-road driving text**
- Maintenance and inspection forms
- Manufacturer's specifications and requirements

### Online Instructor Resources

The following instructor resources are available online at <http://osfm.fire.ca.gov/training/instructorscorner.php>:

- **Supplemental off-road driving text**
- Wildland Fire Apparatus Operations required activities

### Student Resources

To participate in this course, students need:

- **Title, #** Edition, Jones & Bartlett, ISBN-#:
- **Supplemental off-road driving text**
- Personal protective clothing

### 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 wildland fire apparatus to accommodate the students in the class

## Wildland Fire Apparatus Operations

---

- Tools and equipment for inspection and testing
- Water tank
- Pressurized water source
- Static water source
- Adequate space and terrain for required activities

DRAFT

## 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, 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
  - Required student resources
  - Class participation requirements

#### Discussion Questions

1. What is a summative test?

#### Activities

1. To be determined by the instructor.

### Topic 1-2: Fire Apparatus Driver/Operator – Wildland Fire Apparatus Certification Process

#### Terminal Learning Objective

At the end of this topic, a student will be able to identify the courses and requirements for the Fire Apparatus Driver/Operator – Wildland Fire Apparatus certification, and be able to describe the certification task book and testing process.

# Wildland Fire Apparatus Operations

---

## Enabling Learning Objectives

1. Identify the courses required for Fire Apparatus Driver/Operator – Wildland Fire Apparatus certification
  - Fire Apparatus Driver/Operator 1A: Driver/Operator
  - Fire Apparatus Driver/Operator 1B: Pumping Apparatus Operations
2. Identify any other requirements for Fire Apparatus Driver/Operator – Wildland Fire Apparatus certification
  - OSFM certified Fire Fighter I
  - Experience
    - Have a minimum of one (1) year full-time, paid or volunteer, part-time paid experience in a California fire department as a wildland fire apparatus driver/operator
3. Describe the certification task book process
  - Complete all prerequisites and course work
  - Submit application and fees to request certification task book
  - Complete all job performance requirements included in the task book
  - Must have identified evaluator verify individual task completion via signature
  - Must have Fire Chief or authorized representative verify task book completion via signature
  - Must be employed by a California Fire Agency in the position prior to submitting completed task book to State Fire Training
4. Describe the certification testing process
  - Complete course work
  - Schedule online certification test
  - Schedule skills evaluation test

## Discussion Questions

1. What is the experience requirement for Fire Apparatus Driver/Operator – Wildland Fire Apparatus certification?

## Activities

1. To be determined by the instructor.

## Unit 2: Preventive Maintenance

### Topic 2-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Wildland Fire Apparatus

#### Terminal Learning Objective

At the end of this topic, a student, given a wildland fire apparatus, tools and equipment, manufacturer's specifications and requirements, inspection forms, and policies and procedures of the jurisdiction, will be able to perform and document routine tests, inspections, and servicing functions on the systems and components unique to wildland fire

## Wildland Fire Apparatus Operations

---

apparatus, in addition to those in NFPA 1002 Paragraph 4.2.1, to verify their operational status.

### Enabling Learning Objectives

1. Explain the manufacturer's specifications and requirements
2. Discuss the policies and procedures of the jurisdiction, including documentation requirements
3. Describe wildland fire apparatus systems and components
  - Foam systems
  - Pumping systems
  - Water tank and/or other extinguishing agent levels (if applicable)
  - Four-wheel drive system
4. Discuss inspection requirements when transitioning from off-road to on-road operations
5. Inspect wildland fire apparatus
6. Use tools and equipment
7. Recognize system problems and out-of-service criteria
8. Correct any deficiency noted according to policies and procedures and/or manufacturer's specifications and requirements

### Discussion Questions

1. How do you maintain your four-wheel drive during the off-season?
2. Why is it important to do a pretrip and posttrip inspection?
3. What should be inspected when transitioning from off-road to on-road driving?
4. What equipment is unique to a wildland fire apparatus?
5. How can off-road driving affect your air filters?

### Activities

1. Divide students into small groups. Have each group perform an wildland fire apparatus inspection using a form provided by the instructor and present their findings.

**CTS Guide Reference:** CTS 1-1

## Unit 3: Operations

### Topic 3-1: Operate a Wildland Fire Apparatus

#### Terminal Learning Objective

At the end of this topic, a student, given a wildland fire apparatus, applicable laws and regulations, policies and procedures of the jurisdiction, predetermined route off of a public way that incorporates the maneuvers and features that the driver/operator is expected to encounter during normal operations, will be able to operate a wildland fire apparatus in compliance with all applicable jurisdictional rules and regulations and operational limitations of the apparatus.

#### Enabling Learning Objectives

1. Recognize wildland fire apparatus resource typing
2. Explain the effects on vehicle control of braking reaction time and load factors

## Wildland Fire Apparatus Operations

---

3. Explain the effects of high center of gravity on roll-over potential, general steering reactions, speed, and centrifugal force
4. Discuss applicable laws and regulations
5. Review policies and procedures of the jurisdiction
6. Describe the principles of skid avoidance, night driving, shifting, and gear patterns
7. Discuss negotiating intersections, railroad crossings, and bridges
8. Describe weight and height limitations for both roads and bridges
9. Describe automotive gauges and their operation
10. Explain operational limits
11. Discuss off-road wildland fire apparatus emergencies
12. Operate passenger restraint devices
13. Maintain safe following distances
14. Maintain control of the wildland fire apparatus while accelerating, decelerating, and turning, given road, weather, and traffic conditions
15. Operate the wildland fire apparatus under adverse environmental or driving surface conditions
16. Use automotive gauges and controls

### Discussion Questions

1. How do you determine if a bridge is safe to cross?
2. What are some ways to estimate slope in the field?
3. Why is the burn always a good place to start your fire attack and can you deviate from that? If so, when and why?
4. When should you inhibit exhaust regeneration?
5. When should you engage your front axle?
6. How does the use of the auxiliary brake differ between on- and off-road driving?
7. What tactics can you use while encountering uneven road surface to maintain control?
8. What is the safe following distance on a mid-slope road?
9. What are the functions and duties of a spotter?

### Activities

1. Present pictures of wildland driving environments and have the students identify and discuss hazards and mitigation techniques.
2. Activity 3-1-1: Operate a Wildland Fire Apparatus Off-road

**CTS Guide Reference:** CTS 2-1

## Topic 3-2: Produce Effective Fire Streams

### Terminal Learning Objective

At the end of this topic, a student, given a wildland fire apparatus, water tank, pressurized water source, and static water source, will be able to produce an effective fire stream by engaging the pump, setting all pressure-control and vehicle safety devices, and achieving the rated flow of the nozzle while monitoring the apparatus for potential problems.

# Wildland Fire Apparatus Operations

---

## Enabling Learning Objectives

1. Explain hydraulic calculations for friction loss and flow using both written formulas and estimation methods
2. Describe the safe operation of the pump
3. Discuss correct apparatus placement
4. Describe personal safety considerations
5. Discuss the reliability of static water sources
6. Discuss mobile attack operations
7. Position a wildland fire apparatus to operate at a fire hydrant and at a static water source
8. Position apparatus for fire attack
9. Transfer power from vehicle engine to pump
10. Draft
11. Operate pumper pressure control systems
12. Operate the volume/pressure transfer valve (multistage pumps only)
13. Operate auxiliary cooling systems
14. Make the transition between internal and external water sources
15. Assemble hose lines, nozzles, valves, and appliances

## Discussion Questions

1. What is the importance of water conservation and how do you achieve it?
2. What are the dangers of mobile attack with personnel in front of the engine on a hose line?
3. What are your considerations when spotting an apparatus at a static water source?
4. How do you determine what your pump discharge pressure is when you can no longer see the nozzle?
5. How does slope affect your discharge pressure?

## Activities

1. Activity 3-2-1: Produce an Effective Fire Stream

**CTS Guide Reference:** CTS 2-2

# Wildland Fire Apparatus Operations

## Time Table

Segment	Lecture Time	Activity/Skills Time	Total Unit Time
<b>Unit 1: Introduction</b>			
Topic 1-1: Orientation and Administration			
Lecture	0:30		
To be determined by the instructor		0:00	
Topic 1-2: Wildland Fire Apparatus Certification Process			
Lecture	0:30		
To be determined by the instructor		0:00	
<b>Unit 1 Totals</b>	<b>1:00</b>	<b>0:00</b>	<b>1:00</b>
<b>Unit 2: Preventive Maintenance</b>			
Topic 2-1: Perform Routine Tests, Inspections, and Servicing Functions Unique to Wildland Fire Apparatus			
Lecture	0:30		
Recommended by State Fire Training		1:00	
<b>Unit 2 Totals</b>	<b>0:30</b>	<b>1:00</b>	<b>1:30</b>
<b>Unit 3: Operations</b>			
Topic 3-1: Operate a Wildland Fire Apparatus			
Lecture	2:00		
Recommended by State Fire Training		0:30	
Activity 3-1-1: Operate a Wildland Fire Apparatus Off-road		*	
Topic 3-2: Produce an Effective Fire Stream			
Lecture	1:00		
To be determined by the instructor			
Activity 3-2-1: Produce an Effective Fire Stream		*	
<b>Unit 3 Totals</b>	<b>3:00</b>	<b>0:30</b>	<b>3:30</b>
<b>Lecture, Activity, and Unit Totals:</b>	<b>4:30</b>	<b>17:30</b>	<b>22:00</b>

### Course Totals

Total Lecture Time (LT)	4:30
Total Activity Time (AT)	1:30
Total Skills Practice Time (ST)	*17:00
Total Testing Time (TT)	1:00
<b>Total Course Time</b>	<b>24:00</b>

Note: Skills practice time will vary depending on the number of students in the program. It is important to remember that the suggested skill hours are for 30 students.

# Wildland Fire Apparatus Operations

## Activity 3-1-1: Operate a Wildland Fire Apparatus Off-road

---

### Operate a Wildland Fire Apparatus Off-road

#### Activity 3-1-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 8.1.2**

Operate a wildland fire apparatus, given a predetermined route off of a public way that incorporates the maneuvers and features that the driver/operator is expected to encounter during normal operations, so that the vehicle is operated in compliance with all applicable departmental rules and regulations and the design limitations of the vehicle.

**Format:** Individual

**Time Frame:** Open (based on a total of 17:00 hours for skills practice and completion)

#### **Description**

This activity provides students with an opportunity to operate a wildland fire apparatus in compliance with all applicable jurisdictional rules and regulations and operational limitations of the apparatus.

#### **Materials**

- Wildland fire apparatus
- Designated area for off-road driving (driving course requirements are listed below)
- Spotter
- Tools and equipment
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 8.1.2 shall be demonstrated prior to the students practicing and completing each skill.
- The off-road driving course shall include the following driving situations essential to driver/operator skills:
  1. Loose or wet soil
  2. Steep grades (40%; not to exceed manufacturer's recommendation fore and aft)
  3. Limited sight distance
  4. Blind curve and mid-slope in-turns
  5. Vehicle clearance obstacles (height, width, undercarriage (break-over), angle of approach, angle of departure, gates and fences)
  6. Limited space for turnaround
  7. Side slopes (15% side to side; not to exceed manufacturer's recommendation fore and aft)
  8. Varying types of road surface (washboard, heavy silt, gravel, transitioning from gravel to pavement, and water crossing)

# Wildland Fire Apparatus Operations

## Activity 3-2-1: Produce an Effective Fire Stream

---

### Produce an Effective Fire Stream

#### Activity 3-2-1

#### **NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)**

- **Paragraph 8.2.1**

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

- (1) Water tank
- (2) Pressurized source
- (3) Static source

**Format:** Individual

**Time Frame:** Open (based on a total of 17:00 hours for skills practice and completion)

#### **Description**

This activity provides students with an opportunity to produce an effective fire stream during a mobile attack.

#### **Materials**

- Wildland fire apparatus
- Designated area for off-road driving
- Nozzleperson
- Tools and equipment
- Personal protective clothing

#### **Instructor Notes**

- This skill identified under JPR 8.2.1 shall be demonstrated prior to the students practicing and completing each skill.
- This skill, for wildland fire apparatus, does not require a pressurized or static water source. These skills were covered in the Fire Apparatus Driver/Operator 1B course.

# Fire Apparatus Driver/Operator – Water Tender Apparatus

---

## Certification Training Standards Guide [Month 2015]



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

# Fire Apparatus Driver/Operator – Water Tender Apparatus

## Certification Training Standards Guide [Month 2015]

This CTS guide utilizes NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014) to provide the qualifications for State Fire Training's Fire Apparatus Driver/Operator – Water Tender Apparatus certification.

State Fire Training coordinated the development of this CTS guide. Before its publication, the Statewide Training and Education Advisory Committee (STEAC) and the State Board of Fire Services (SBFS) recommended this CTS guide for adoption by the Office of the State Fire Marshal (OSFM).

**CALIFORNIA  
STATE FIRE**



**TRAINING**

Published by State Fire Training  
1131 S Street, Sacramento, CA 95811  
(916) 445-8200

Cover photo courtesy of [Karen Wilson, Mariposa County Fire Department]

# Table of Contents

State Fire Training .....	1
Acknowledgments.....	2
How to Read a CTS Guide.....	5
Fire Apparatus Driver/Operator – Water Tender .....	7
Section 1: Preventive Maintenance .....	7
1-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Water Tenders .....	7
Section 2: Operations.....	8
2-1: Operate a Water Tender .....	8
2-2: Maneuver and Position a Water Tender at a Water Shuttle Fill Site .....	9
2-3: Maneuver and Position a Water Tender at an Established Water Shuttle Dumpsite.....	10
2-4: Establish a Water Shuttle Dumpsite .....	11
State Fire Training Content.....	12

# State Fire Training

## Mission

To enable the California Fire Service to safely protect life and property through education, training, and certification.

## The California Fire Services 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.

CFSTES facilitates, coordinates, and assists in the development and implementation of standards and certification for the California fire service. CFSTES:

1. Administers the California Fire Academy System
2. Provides accredited courses leading to certification and approved standardized training programs for local and regional delivery
3. Administers the national accreditation process in California
4. Publishes certification training standards, course plans, and a certification task book for each certified level in the California fire service

CFSTES is a fire service system developed by the fire service, for the fire service. It is only as successful and effective as the people involved in it.

## Acknowledgments

State Fire Training appreciates the hard work and accomplishments of those who built the solid foundation on which this program continues to grow.

State Fire Training gratefully acknowledges the following individuals and organizations for their diligent efforts and contributions that made the development and publication of this document possible.

### CAL FIRE

**Ken Pimlott**

*Director, CAL FIRE*

**Tonya Hoover**

*State Fire Marshal*

**Mike Richwine**

*Assistant State Fire Marshal*

**Vacant**

*Chief, State Fire Training*

**Ron Coleman**

*Chair, STEAC*

### Cadre Leadership

**Mark Romer**

*Cadre Leader*

*Fire Service Training Specialist III, Office of the State Fire Marshal*

**Alicia Hamilton**

*Cadre Editor*

*Sacramento State*

### Cadre Members

**Jonathan Black**

*Captain, Santa Clara County Fire Department*

*Development and Validation Cadre*

## Acknowledgments

---

**Bruce Fosdike**

*Captain, CAL FIRE (Retired), San Luis Obispo Unit  
Development Cadre*

**Daniel Hoy**

*Engineer, Sacramento Metropolitan Fire District  
Development Cadre*

**Timothy McIntyre**

*Engineer, Los Angeles County Fire Department  
Development and Validation Cadre*

**Drew Oliphant**

*Engineer, Los Angeles Fire Department  
Development and Validation Cadre*

**Ann Johnston Rosales**

*Battalion Chief, CAL FIRE/Fire Academy  
Development and Validation Cadre*

**Steve Walton**

*Engineer, Larkspur Fire Department  
Development Cadre*

**Karen Wilson**

*Lieutenant, Mariposa County Fire Department  
Development and Validation Cadre*

## Validation Members

**Craig Berchtold**

*Engineer, Livermore-Pleasanton Fire Department  
Validation Cadre*

**Bret Black**

*Captain, Clovis Fire Department  
Validation Cadre*

**Steve Castagnola**

*Engineer, San Bernardino County Fire Department  
Validation Cadre*

## Acknowledgments

---

**Boyd Clegg**

*Assistant Chief, Vacaville Fire Protection District  
Validation Cadre*

**Jim Colston**

*Captain, San Marcos Fire Department  
Validation Cadre*

**DeWayne Felkins**

*Captain, Sacramento Fire Department  
Validation Cadre*

**John Malone**

*Captain, Dixon Fire Department  
Validation Cadre*

**Kelly Tassone**

*Captain (Retired), Sacramento Metropolitan Fire District  
Validation Cadre*

**Tanisha Tucker**

*Engineer, Oakland Fire Department  
Validation Cadre*

## Partners

State Fire Training also extends special acknowledgement and appreciation to the Conference and Training Services Unit with the College of Continuing Education at California State University, Sacramento, for its ongoing meeting logistics and curriculum development support, innovative ideas, and forward-thinking services. This collaboration is made possible through an interagency agreement between CAL FIRE and Sacramento State.

## How to Read a CTS Guide

State Fire Training develops a Certification Training Standards (CTS) Guide for a variety of job functions in the fire service such as firefighter, driver/operator, fire instructor, and company officer. The CTS guide lists the requisite knowledge and skills and the job performance requirements a person is expected to complete in order to become certified in a specific function. CTS guides are appropriate for fire service personnel and individuals in related occupations pursuing State Fire Training certification.

Each CTS guide serves as a foundation for the certification programs recommended for adoption by the Office of the State Fire Marshal. Any certification program must be based on job-related knowledge and measurable performance standards. To master the knowledge and skills needed for specialized operations, individuals will require additional training to augment the performance standards included in the CTS guide.

Within the CTS guide, it is impossible to capture the different policies and procedures of each organization in the California fire service. Individuals aspiring to meet State Fire Training's certification training standards must do so in accordance with the codes, standards, regulations, policies, and standard operating procedures applicable within their own departments or jurisdictions.

### Format

Each certification training standard included in the CTS guide includes the following:

#### Section Heading

The section heading describes a general category for a group of training standards. For example, the Fire Marshal CTS includes the following sections: Administration, Risk Management, Community Relations, Professional Development, Regulatory Programs, Fire and Life Safety, and Investigation. Each section contains one or more individual training standards.

#### Training Standard Title

The training standard title provides a general description of the performance requirement contained within the standard.

#### Authority

The CTS guide references each standard with one or more paragraphs of the corresponding National Fire Protection Association (NFPA) Professional Qualifications. This ensures that each fire service function within California's certification system meets or exceeds NFPA standards.

When California requirements exceed the NFPA standard, the CTS guide cites the Office of the State Fire Marshal as the authority and prints the corresponding information in *italics*.

### **Given**

This section lists the objects, equipment, materials, or facilities an individual needs in order to acquire the requisite knowledge and skills or to accomplish the job performance requirement(s) within a training standard.

### **Requisite Knowledge and Skills**

This section lists the knowledge and skills that an individual must acquire in order to accomplish the job performance requirement(s) within a training standard.

This section does not include NFPA requisite knowledge or skills that are too general to teach or that individuals should develop through life experiences. For example, a training standard would not list “communicate orally and in writing” or “ability to relate interpersonally” unless they specifically apply to a job performance requirement about acquiring communication skills or developing interpersonal relationships.

### **Job Performance Requirements**

This section includes one or more written statements that describe a specific job-related task and define measurable or observable outcomes. After an individual completes all coursework and requisite requirements, the certification task book process verifies completion of job performance requirements.

## **Content**

In addition to the individual certification training standards, the CTS guide also includes State Fire Training Revisions and Errata pages.

### **State Fire Training Content**

Located at the back of the CTS guide, this table documents any significant revisions made by State Fire Training to the NFPA standards in the development of this CTS guide. This table is used to justify content additions and advise the course plan development team.

### **Errata**

Located at the back of the CTS guide, this page documents any changes made to the CTS guide outside of the five-year NFPA revision cycle.

# Fire Apparatus Driver/Operator – Water Tender

## Section 1: Preventive Maintenance

### 1-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Water Tenders

#### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 10.1.1

Office of the State Fire Marshal

#### Given

1. *Water tender*
2. *Tools and equipment*
3. *Manufacturer's specifications and requirements*
4. *Maintenance and inspection forms*
5. Policies and procedures of the jurisdiction

#### Requisite Knowledge and Skills

1. *Recognize manufacturer specifications and requirements*
2. *Review policies and procedures of the jurisdiction, including documentation requirements*
3. *Describe water tender systems and components*
4. *Use tools and equipment*
5. *Inspect a water tender*
6. *Recognize system problems and out-of-service criteria*
7. *Correct any deficiency noted according to policies and procedures and/or manufacturer specifications and requirements*

#### Job Performance Requirements

Perform and document routine tests, inspections, and servicing functions on the systems and components unique to a water tender, in addition to those in NFPA 1002 Paragraph 4.2.1, to verify their operational status.

## Section 2: Operations

### 2-1: Operate a Water Tender

#### Authority

Office of the State Fire Marshal

#### Given

1. *Water tender*
2. *Applicable laws and regulations*
3. *Policies and procedures of the jurisdiction*
4. *Predetermined route off of a public way that incorporates the maneuvers and features that the driver/operator is expected to encounter during normal operations*

#### Requisite Knowledge and Skills

1. *Recognize water tender resource typing*
2. *Explain the effects on vehicle control of braking reaction time and load factors*
3. *Explain the effects of high center of gravity on roll-over potential, general steering reactions, speed, and centrifugal force*
4. *Review policies and procedures of the jurisdiction*
5. *Describe the principles of skid avoidance, night driving, shifting, and gear patterns*
6. *Discuss negotiating intersections, railroad crossings, soft shoulders, grade, and bridges*
7. *Describe weight and height limitations for both roads and bridges*
8. *Explain operational limits*
9. *Discuss off-pavement water tender emergencies*
10. *Operate passenger restraint devices*
11. *Maintain safe following distances*
12. *Maintain control of the water tender while accelerating, decelerating, and turning, given road, weather, and traffic conditions*
13. *Operate the tender under adverse environmental or driving surface conditions*
14. *Use automotive gauges and controls*

#### Job Performance Requirements

*Operate a water tender in compliance with all applicable jurisdictional rules and regulations and operational limitations of the apparatus.*

## 2-2: Maneuver and Position a Water Tender at a Water Shuttle Fill Site

### Authority

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 10.2.1

Office of the State Fire Marshal

### Given

1. *Water tender*
2. Fill site location
3. One or more supply hose

### Requisite Knowledge and Skills

1. *Describe* local procedures for establishing a water shuttle fill site
2. *Discuss the correct positioning of a water tender at a water shuttle fill site*
3. *Identify* locations of the water tank intakes on the *water tender*
4. Determine a correct position for the *water tender*
5. Maneuver the *water tender* into the correct position
6. Avoid obstacles to operations

### Job Performance Requirements

Maneuver and position a water tender at a water shuttle fill site, without striking any objects or stretching additional hose, and attach supply hose to the intake connections.

## **2-3: Maneuver and Position a Water Tender at an Established Water Shuttle Dumpsite**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 10.2.2

### **Given**

1. *Water tender*
2. Established water dumpsite
3. Portable water tank

### **Requisite Knowledge and Skills**

1. *Describe* local procedures for operating a water tender at a water shuttle dumpsite
2. *Identify* locations of the water tank discharges on the water tender
3. *Discuss the correct positioning of a water tender at a water shuttle dumpsite*
4. Determine a correct position for the water tender
5. Maneuver the water tender into the correct position
6. Avoid obstacles to operations
7. Operate the fire pump or rapid water dump system

### **Job Performance Requirements**

Maneuver and position a water tender at a water shuttle dumpsite and discharge all of the water from the water tender into the portable tank without striking any object at the dumpsite.

## **2-4: Establish a Water Shuttle Dumpsite**

### **Authority**

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 10.2.3

### **Given**

1. *One or more water tenders*
2. Two or more portable water tanks
3. Low-level strainers
4. *Hard suction hose*
5. Fire hose
6. Pumping apparatus

### **Requisite Knowledge and Skills**

1. *Describe* local procedures for establishing a water shuttle dumpsite
2. *Describe* the principles of water transfer between multiple portable water tanks
3. Deploy portable water tanks
4. Connect and operate water transfer equipment
5. Connect a strainer and suction hose to the fire pump

### **Job Performance Requirements**

Establish a water shuttle dumpsite by keeping the draft tank full at all times, emptying the dump tank, and transferring the water from one tank to the next.

## State Fire Training Content

**Code Key**

**Blocks**

- G = Given
- RKS = Requisite Knowledge and Skills
- JPR = Job Performance Requirements
- NCTS = New certification training standard

**Sources**

- [ACRONYM = Title]
- [ACRONYM = Title]
- [ACRONYM = Title]

### Certification: Fire Apparatus Driver/Operator – Water Tender

CTS	Block	Addition	Justification	Source/Reference
1-1	G	Water tender		
1-1	G	Tools and equipment		
1-1	G	Manufacturer’s specifications and requirements		
1-1	G	Maintenance and inspection forms		
1-1	RKS	Describe water tender systems and components		
1-1	RKS	Inspect a water tender		
2-1		Operate a Water Tender		
2-1	G	Water tender		
2-1	G	Applicable laws and regulations		
2-1	G	Policies and procedures of the jurisdiction		
2-1	G	Predetermined route off of a public way that incorporates the maneuvers and features that the driver/operator is expected to encounter during normal operations		

Errata

CTS	Block	Addition	Justification	Source/Reference
2-1	RKS	Recognize water tender resource typing		
2-1	RKS	Explain the effects on vehicle control of braking reaction time and load factors		
2-1	RKS	Explain the effects of high center of gravity on roll-over potential, general steering reactions, speed, and centrifugal force		
2-1	RKS	Review policies and procedures of the jurisdiction		
2-1	RKS	Describe the principles of skid avoidance, night driving, shifting, and gear patterns		
2-1	RKS	Discuss negotiating intersections, railroad crossings, soft shoulders, grade, and bridges		
2-1	RKS	Describe weight and height limitations for both roads and bridges		
2-1	RKS	Explain operational limits		
2-1	RKS	Discuss off-pavement water tender emergencies		
2-1	RKS	Operate passenger restraint devices		
2-1	RKS	Maintain safe following distances		
2-1	RKS	Maintain control of the water tender while accelerating, decelerating, and turning, given road, weather, and traffic conditions		
2-1	RKS	Operate the tender under adverse environmental or driving surface conditions		
2-1	RKS	Use automotive gauges and controls		
2-2	G	Water tender		
2-3	G	Water tender		

## Errata

---

<b>CTS</b>	<b>Block</b>	<b>Addition</b>	<b>Justification</b>	<b>Source/Reference</b>
2-4	G	One or more water tenders		
2-4	G	Hard suction hose		



# Water Tender Operations

## Course Plan

### Course Details

<b>Certification:</b>	Fire Apparatus Driver/Operator – Water Tender
<b>CTS Guide:</b>	Fire Apparatus Driver/Operator (Month Year)
<b>Description:</b>	This course provides information on water tender preventive maintenance and operations. Topics include routine tests, inspections, and servicing functions unique to a water tender; maneuvering and positioning a water tender at a water shuttle fill site; and establishing, maneuvering, and positioning at a water shuttle dumpsite. This course is based on the 2014 edition of <i>NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications</i> .
<b>Designed For:</b>	Career and volunteer fire service personnel who drive and operate a water tender
<b>Prerequisites:</b>	Hold a valid Class C Firefighter Endorsed driver’s license (minimum) Successfully completed OSFM Fire Fighter I training Successfully completed Fire Apparatus Driver/Operator 1A Successfully completed Fire Apparatus Driver/Operator 1B Completed a minimum of four (4) hours driving a water tender Completed the activities from Driver/Operator 1A while driving a water tender
<b>Standard:</b>	Complete all activities and skills Complete the summative test with a minimum score of 80%
<b>Hours:</b>	Lecture: 6:30 Activities: 4:00 Skills: 20:30 Testing: 1:00
<b>Hours (Total):</b>	32:00
<b>Maximum Class Size:</b>	30

## Water Tender Operations

---

**Instructor Level:** This course requires one (1) primary instructor and sufficient assistant instructors to meet the skills ratio

**Instructor/Student Ratio:** Lecture: 1:30 Skills: 1:10

**Restrictions:** Sufficient fire apparatus and adequate space to accommodate the students in the class and the required skills

**SFT Designation:** CFSTES

### Required Resources

#### Instructor Resources

To teach this course, instructors need:

- *Fire Apparatus Driver/Operator*, Second Edition, Jones & Bartlett, ISBN-13: 978-1-284-02691-7
- *or*
- *Aerial Apparatus Driver/Operator Handbook*, Third Edition, IFSTA, ISBN-13: 9780134027234
- Maintenance and inspection forms
- Manufacturer's specifications and requirements

#### Online Instructor Resources

The following instructor resources are available online at <http://osfm.fire.ca.gov/training/instructorscorner.php>:

- Water Tender Operations required activities

#### Student Resources

To participate in this course, students need:

- *Fire Apparatus Driver/Operator*, Second Edition, Jones & Bartlett, ISBN-13: 978-1-284-02691-7
- *or*
- *Aerial Apparatus Driver/Operator Handbook*, Third Edition, IFSTA, ISBN-13: 9780134027234
- Personal protective clothing

#### 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 and erasers
- Computer or tablet with presentation or other viewing software

## Water Tender Operations

---

- Amplification devices
- Projector and screen
- Sufficient water tenders to accommodate the students in the class
- Pumping apparatus
- Tools and equipment for inspection and testing
- Fill site location
- Dumpsite location
- Fire hose
- Soft and hard suction supply hose
- Portable water tanks
- Low-level strainers

DRAFT

## 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, 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
  - Required student resources
  - Class participation requirements

#### Discussion Questions

1. What is a formative test? What is a summative test?

#### Activities

1. To be determined by the instructor.

### Topic 1-2: Fire Apparatus Driver/Operator – Water Tender Certification Process

#### Terminal Learning Objective

At the end of this topic, a student will be able to identify the courses and requirements for the Fire Apparatus Driver/Operator – Water Tender certification, and be able to describe the certification task book and testing process.

#### Enabling Learning Objectives

1. Identify the courses required for Fire Apparatus Driver/Operator – Water Tender certification

## Water Tender Operations

---

- Fire Apparatus Driver/Operator 1A: Driver/Operator
  - Fire Apparatus Driver/Operator 1B: Pumping Apparatus Operations
2. Identify any other requirements for Fire Apparatus Driver/Operator – Water Tender certification
    - OSFM certified Fire Fighter I
    - Experience
      - Have a minimum of one (1) year full-time, paid or volunteer/part-time experience in a California fire department as a water tender driver/operator
  3. Describe the certification task book process
    - Complete all prerequisites and course work
    - Submit application and fees to request certification task book
    - Complete all job performance requirements included in the task book
    - Must have identified evaluator verify individual task completion via signature
    - Must have Fire Chief or authorized representative verify task book completion via signature
    - Must be employed by a California Fire Agency in the position prior to submitting completed task book to State Fire Training
  4. Describe the certification testing process
    - Complete course work
    - Schedule online certification test
    - Schedule skills evaluation test

### Discussion Questions

1. What is the experience requirement for Fire Apparatus Driver/Operator – Water Tender certification?

### Activities

1. To be determined by the instructor.

## Unit 2: Preventive Maintenance

### Topic 2-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Water Tenders

#### Terminal Learning Objective

At the end of this topic, a student, given a water tender, tools and equipment, maintenance and inspection forms, manufacturer's specifications and requirements, inspection forms, and policies and procedures of the jurisdiction, will be able to perform and document routine tests, inspections, and servicing functions unique to a water tender, in addition to those in NFPA 1002 Paragraph 4.2.1, to verify their operational status.

#### Enabling Learning Objectives

1. Recognize manufacturer specifications and requirements
2. Review policies and procedures of the jurisdiction, including documentation requirements

## Water Tender Operations

---

3. Describe water tender systems and components
  - Foam system (if applicable)
  - Pumping system (if applicable)
  - Rapid dump system (if applicable)
  - Water tank and other extinguishing agent levels (if applicable)
4. Use tools and equipment
5. Inspect a water tender
6. Recognize system problems and out-of-service criteria
7. Correct any deficiency noted according to policies and procedures and/or manufacturer specifications and requirements

### Discussion Questions

1. What equipment or components are unique to a water tender?
2. What should be inspected on a rapid dump system?
3. What other extinguishing agents may exist on a water tender?

### Activities

1. Divide students into small groups. Have each group perform a water tender inspection using a form provided by the instructor and present their findings.

**CTS Guide Reference:** CTS 1-1

## Unit 3: Operations

### Topic 3-1: Operate a Water Tender

#### Terminal Learning Objective

At the end of this topic, a student, given a water tender, applicable laws and regulations, policies and procedures of the jurisdiction, predetermined route off of a public way that incorporates the maneuvers and features that the driver/operator is expected to encounter during normal operations, will be able to operate a water tender in compliance with all applicable jurisdictional rules and regulations and operational limitations of the apparatus.

#### Enabling Learning Objectives

1. Recognize water tender resource typing
2. Explain the effects on vehicle control of braking reaction time and load factors
3. Explain the effects of high center of gravity on roll-over potential, general steering reactions, speed, and centrifugal force
4. Review policies and procedures of the jurisdiction
5. Describe the principles of skid avoidance, night driving, shifting, and gear patterns
6. Discuss negotiating intersections, railroad crossings, soft shoulders, grade, and bridges
7. Describe weight and height limitations for both roads and bridges
8. Describe automotive gauges and their operation
9. Explain operational limits
10. Discuss off-pavement water tender emergencies
11. Operate passenger restraint devices
12. Maintain safe following distances

## Water Tender Operations

---

13. Maintain control of the water tender while accelerating, decelerating, and turning, given road, weather, and traffic conditions
14. Operate the water tender under adverse environmental or driving surface conditions
15. Use automotive gauges and controls

### Discussion Questions

1. How do you determine if a bridge is safe to cross?
2. What are some ways to estimate slope in the field?
3. When should you inhibit exhaust regeneration?
4. When should you engage your front axle?
5. When do you lock your rear axle?
6. How does the use of the auxiliary brake differ between on- and off-pavement driving?
7. What tactics can you use while encountering uneven road surface to maintain control?
8. What is the safe following distance on a mid-slope road?

### Activities

1. Divide students into small groups. Have each group research accidents involving water tenders. Have each group identify and discuss hazards and mitigation techniques and present their findings to the class.
2. Activity 3-1-1: Operate a Water Tender Off-pavement

**CTS Guide Reference:** CTS 2-1

## Topic 3-2: Maneuver and Position a Water Tender at a Water Shuttle Fill Site

### Terminal Learning Objective

At the end of this topic, a student, given a water tender, fill site location, and one or more supply hose, will be able to maneuver and position a water tender at a water shuttle fill site, without striking any objects or stretching additional hose, and attach supply hose to the intake connections.

### Enabling Learning Objectives

1. Describe local procedures for establishing a water shuttle fill site
2. Discuss the correct positioning of a water tender at a water shuttle fill site
3. Identify locations of the water tank intakes on the water tender
4. Determine a correct position for the water tender
5. Maneuver the water tender into the correct position
6. Avoid obstacles to operations

### Discussion Questions

1. What are some obstacles that might be encountered at a water shuttle fill site?
2. Why does the driver/operator need to complete a walk-around before leaving the fill site?
3. How do you determine reference points when positioning at a fill site and what is the advantage of doing so?

### Activities

1. Present pictures of potential water shuttle fill site locations and have the student discuss the pros and cons of the site.

## Water Tender Operations

---

2. Activity 3-1-1: Maneuver and Position a Water Tender at a Water Shuttle Fill Site

**CTS Guide Reference:** CTS 2-2

### Topic 3-3: Establish a Water Shuttle Dumpsite

#### Terminal Learning Objective

At the end of this topic, a student, given one or more water tenders, two or more portable water tanks, low-level strainers, water transfer equipment, fire hose, and pumping apparatus, will be able to establish a water shuttle dumpsite by keeping the draft tank full at all times, emptying the dump tank, and transferring the water from one tank to the next.

#### Enabling Learning Objectives

1. Describe local procedures for establishing a water shuttle dumpsite
2. Describe the principles of water transfer between multiple portable water tanks
3. Deploy portable water tanks
4. Connect and operate water transfer equipment
5. Connect a strainer and suction hose to the fire pump

#### Discussion Questions

1. What considerations should be taken when setting up the traffic pattern for a dumpsite?
2. What types of surfaces should be avoided for a dumpsite?
3. What are the consequences of ground saturation?
4. What are the consequences of using muddy/contaminated water?
5. What are the considerations for a long-term dumpsite?

#### Activities

1. Divide students into small groups. Have each group select a location from a map provided by the instructor and diagram a dumpsite. A spokesperson for each group will present their diagram to the class.
2. Activity 3-2-1: Establish a Water Shuttle Dumpsite

**CTS Guide Reference:** CTS 2-4

### Topic 3-4: Maneuver and Position a Water Tender at an Established Water Shuttle Dumpsite

#### Terminal Learning Objective

At the end of this topic, a student, given a water tender, dumpsite, and portable water tank, will be able to maneuver and position a water tender at an established water shuttle dumpsite and discharge all of the water from the water tender into the portable tank without striking any object at the dumpsite.

#### Enabling Learning Objectives

1. Describe local procedures for operating a water tender at a water shuttle dumpsite
2. Identify locations of the water tank discharges on the water tender
3. Discuss the correct positioning of a water tender at a water shuttle dumpsite
4. Determine a correct position for the water tender
5. Maneuver the water tender into the correct position
6. Avoid obstacles to operations

## Water Tender Operations

---

7. Operate the fire pump or rapid water dump system

### Discussion Questions

1. What are some safety considerations for using a rapid dump system?
2. What are some considerations for setting up for a water dump?

### Activities

1. To be determined by the instructor.
2. Activity 3-3-1: Maneuver and Position a Water Tender at an Established Water Shuttle Dumpsite

**CTS Guide Reference:** CTS 2-3

DRAFT

# Water Tender Operations

## Time Table

Segment	Lecture Time	Activity/Skills Time	Total Unit Time
<b>Unit 1: Introduction</b>			
Topic 1-1: Orientation and Administration			
Lecture	0:30		
To be determined by the instructor			
Topic 1-2: Water Tender Certification Process			
Lecture	0:30		
To be determined by the instructor			
<b>Unit 1 Totals</b>	<b>1:00</b>	<b>0:00</b>	<b>1:00</b>
<b>Unit 2: Preventive Maintenance</b>			
Topic 2-1: Perform and Document Routine Tests, Inspections, and Servicing Functions Unique to Water Tenders			
Lecture	1:00		
Recommended by State Fire Training		1:00	
<b>Unit 2 Totals</b>	<b>1:00</b>	<b>1:00</b>	<b>2:00</b>
<b>Unit 3: Operations</b>			
Topic 3-1: Operate a Water Tender			
Lecture	2:00		
Recommended by State Fire Training		1:00	
Activity 3-1-1: Operate a Water Tender Off-pavement		*	
Topic 3-2: Maneuver and Position a Water Tender at a Water Shuttle Fill Site			
Lecture	1:00		
Recommended by State Fire Training		0:30	
Activity 3-2-1: Maneuver and Position a Water Tender at a Water Shuttle Fill Site		*	
Topic 3-3: Establish a Water Shuttle Dumpsite			
Lecture	1:00		
Recommended by State Fire Training		1:30	
Activity 3-3-1: Establish a Water Shuttle Dumpsite		*	
Topic 3-4: Maneuver and Position a Water tender at a Water Shuttle Dumpsite			
Lecture	0:30		
To be determined by the instructor			
Activity 3-4-1: Maneuver and Position a Water Tender at an Established Water Shuttle Dumpsite		*	
<b>Unit 3 Totals</b>	<b>4:30</b>	<b>3:00</b>	<b>7:30</b>
<b>Lecture, Activity, and Unit Totals:</b>	<b>6:30</b>	<b>4:00</b>	<b>9:30</b>

### Course Totals

Total Lecture Time (LT)	6:30
Total Activity Time (AT)	4:00

## Water Tender Operations

---

Total Skills Practice Time (ST)	*20:30
Total Testing Time (TT)	1:00
<b>Total Course Time</b>	<b>32:00</b>

Note: Skills time will vary depending on the number of students in the program. It is important to remember that the suggested skill hours are for 30 students.

DRAFT

## Water Tender Operations

### Activity 3-1-1: Operate a Water Tender Off-pavement

---

## Operate a Water Tender Off-pavement

### Activity 3-1-1

**Format:** Individual

**Time Frame:** Open (based on a total of 20:30:00 hours for skills practice and completion)

#### Description

This activity provides students with an opportunity to operate a water tender in compliance with all applicable jurisdictional rules and regulations and operational limitations of the apparatus.

#### Materials

- Water tender
- Designated area for off-pavement driving (driving course requirements are listed below)
- Spotter
- Tools and equipment
- Personal protective clothing

#### Instructor Notes

- The off-pavement driving course shall include the following driving situations essential to driver/operator skills:
  1. Loose or wet soil
  2. Steep grades (40%; not to exceed manufacturer's recommendation fore and aft)
  3. Limited sight distance
  4. Blind curve and mid-slope in-turns
  5. Vehicle clearance obstacles (height, width, undercarriage [break-over], angle of approach, angle of departure, gates and fences)
  6. Limited space for turnaround
  7. Side slopes (15% side to side; not to exceed manufacturer's recommendation fore and aft)
  8. Varying types of road surface (washboard, heavy silt, gravel, and transitioning from gravel to pavement)

## Water Tender Operations

### Activity 3-2-1: Maneuver and Position a Water Tender at a Water Shuttle Fill Site

---

## Maneuver and Position a Water Tender at a Water Shuttle Fill Site

### Activity 3-2-1

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 10.2.1

Maneuver and position a mobile water supply apparatus at a water shuttle fill site, given a fill site location and one or more supply hose, so that the apparatus is correctly positioned, supply hose are attached to the intake connections without having to stretch additional hose, and no objects are struck at the fill site.

**Format:** Individual

**Time Frame:** Open (based on a total of 20:30 hours for skills practice and completion)

### Description

This activity provides students with an opportunity to maneuver and position a water tender at a water shuttle fill site.

### Materials

- Water tender
- Fill site location
- One (1) or more supply hose
- Tools and equipment
- Personal protective clothing

### Instructor Notes

- This skill identified under JPR 10.2.1 shall be demonstrated prior to the students practicing and completing the skill.

## Water Tender Operations

### Activity 3-3-1: Establish a Water Shuttle Dumpsite

---

## Establish a Water Shuttle Dumpsite

### Activity 3-3-1

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 10.2.3

Establish a water shuttle dump site, given two or more portable water tanks, low-level strainers, water transfer equipment, fire hose, and a fire apparatus equipped with a fire pump, so that the tank being drafted from is kept full at all times, the tank being dumped into is emptied first, and the water is transferred efficiently from one tank to the next.

**Format:** Individual

**Time Frame:** Open (based on a total of 20:30 hours for skills practice and completion)

### Description

This activity provides students with an opportunity to establish a water shuttle dumpsite.

### Materials

- Two (2) or more portable tanks
- Low-level strainers
- Water transfer equipment
- Fire hose
- Pumping apparatus
- Tools and equipment
- Personal protective clothing

### Instructor Notes

- This skill identified under JPR 10.2.3 shall be demonstrated prior to the students practicing and completing the skill.

## Water Tender Operations

Activity 3-4-1: Maneuver and Position a Water Tender at an Established Water Shuttle Dumpsite

---

### Maneuver and Position a Water Tender at an Established Water Shuttle Dumpsite

#### Activity 3-4-1

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2014)

- Paragraph 10.2.2

Maneuver and position a mobile water supply apparatus at a water shuttle dump site, given a dump site and a portable water tank, so that all of the water being discharged from the apparatus enters the portable tank and no objects are struck at the dump site.

**Format:** Individual

**Time Frame:** Open (based on a total of 20:30 hours for skills practice and completion)

#### Description

This activity provides students with an opportunity to maneuver and position a water tender at an established water shuttle dumpsite.

#### Materials

- Water tender
- Established water shuttle dumpsite
- Portable water tank
- Tools and equipment
- Personal protective clothing

#### Instructor Notes

- This skill identified under JPR 10.2.2 shall be demonstrated prior to the students practicing and completing the skill.