



Water Tender Operations (2024)

Course Plan

Course Details

- Certification:** Water Tender Driver/Operator (2024)
- CTS Guide:** Fire Apparatus Driver/Operator (2024)
- Description:** This course provides the knowledge and skills needed to perform preventive maintenance on and operate a water tender. 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; filling a pumping apparatus; and establishing, maneuvering, and positioning at a water shuttle dump site.
- Designed For:** Personnel who drive and operate a water tender
- Course Prerequisites:** OSFM certified Fire Fighter 1 or certified Fire Fighter 2 tenured path (Appointment to the rank of Officer (Lieutenant or higher) waives this prerequisite. Appointment to the CAL FIRE rank of Fire Apparatus Engineer is equivalent to Officer level. Performing in an “acting” capacity does not fulfill this requirement.)
- FADO 1A: Fire Apparatus Driver/Operator (2017 or newer)
- FADO 1B: Pumping Apparatus Operations (2017 or newer)
- One of the following driver’s licenses: Class C fire fighter endorsed, Commercial A, or Commercial B
- Standard:** Complete all activities, skills, and tests
- Complete all summative tests with a minimum score of 80%
- Hours (Total):** 32 hours (7 lecture / 24 application / 1 testing)
- Maximum Class Size:** 30
- Instructor Level:** SFT Water Tender Driver/Operator Registered Instructor
- Instructor/Student Ratio:** 1:30 (lecture) / 1:8 (application)
- Restrictions:** Sufficient fire apparatus and space to accommodate classroom and skills training
- SFT Designation:** CFSTES

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Required Resources

Instructor Resources

To teach this course, instructors need:

- One of the following textbooks
 - *Fire Apparatus Driver/Operator: Pump, Aerial, Tiller, and Mobile Water Supply* (Jones & Bartlett, current edition)
 - *Pumping and Aerial Apparatus Driver/Operator Handbook* (IFSTA, current edition)
- Maintenance and inspection forms
- Manufacturer's specifications and requirements

Online Instructor Resources

The following instructor resources are available online at <https://osfm.fire.ca.gov/what-we-do/state-fire-training/professional-certifications>:

- Water Tender Operations required activities
 - Activity 3-1(a): Operating a Water Tender on Pavement
 - Activity 3-1(b): Operate a Water Tender off Pavement
 - Activity 3-2: Maneuver and Position a Water Tender at a Water Shuttle Fill Site
 - Activity 3-4: Establish a Water Shuttle Dump Site
 - Activity 3-5: Maneuver and Position a Water Tender at an Established Water Shuttle Dump Site

Student Resources

To participate in this course, students need:

- Textbook selected by instructor
- Personal protective equipment (minimum = long pants, wildland jacket, gloves, helmet, footwear with toe protection)

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
 - Amplification devices
 - Projector and screen
- Sufficient water tenders to accommodate the students in the class
 - Recommend at least 30 minutes of drive time per student across Topics 3-1 through 3-5
- Pumping apparatus

- Adequate space to accommodate the required skills
- Tools and equipment for inspection and testing
- Fill site location
- Dump site location
- Fire hose
- Soft and hard suction supply hose
- Portable water tanks
- Low-level strainers
- Personal protective equipment (students)

Timetable

Segment	Lecture	Application	Unit Total
Unit 1: Introduction			
Topic 1-1: Orientation and Administration	0.5	0.0	
Topic 1-2: Water Tender Driver/Operator Certification	0.5	0.0	
Unit 1 Totals	1.0	0.0	1.0
Unit 2: Preventive Maintenance			
Topic 2-1: Performing and Documenting Visual and Operational Checks	1.0	1.0	
Unit 2 Totals	1.0	1.0	2.0
Unit 3: Operations			
Topic 3-1: Operating a Water Tender	2.0	*	
Topic 3-2: Maneuvering and Positioning a Water Tender at a Water Shuttle Fill Site	1.0	*	
Topic 3-3: Filling a Pumping Apparatus	0.5	*	
Topic 3-4: Establishing a Water Shuttle Dump Site	1.0	*	
Topic 3-5: Maneuvering and Positioning a Water Tender at a Water Shuttle Dump Site	0.5	*	
Unit 3 Totals	5.0	23.0	28.0
Summative Assessment			
Determined by AHJ or educational institution	0.0	1.0	1.0
Skills Practice (Lab / Sets and Reps)			
Determined by AHJ or educational institution	0.0	0.0	0.0
Course Totals:	7.0	25.0	32.0

* Individual application time determined by instructor for a total of 23 hours for Unit 3. Recommend at least 30 minutes of drive time per student across Topics 3-1 through 3-5.

Timetable Key

1. The Timetable documents the amount of time required to deliver the content included in the course plan.
2. Time is documented using the quarter system:
 - 15 min. = 0.25 hours
 - 30 min. = 0.50 hours
 - 45 min. = 0.75 hours
 - 60 min. = 1.00 hours

3. The Course Totals do not reflect time for lunch (1 hour) or breaks (10 minutes per each 50 minutes of instruction or assessment). It is the instructor's responsibility to add this time based on the course delivery schedule.
4. Application (activities, skills exercises, and formative testing) time will vary depending on the number of students enrolled. The Application time documented is based on the maximum class size identified in the Course Details section.
5. Summative Assessments are determined and scheduled by the authority having jurisdiction. These are not the written or psychomotor State Fire Training certification exams. These are in-class assessments to evaluate student progress and calculate course grades.

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

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

Enabling Learning Objectives

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

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Instructor Notes

1. None

Topic 1-2: Water Tender Driver/Operator Certification

Terminal Learning Objective

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

Enabling Learning Objectives

1. Identify different levels of certification in the Fire Apparatus Driver/Operator certification track
 - Pumping Apparatus
 - Aerial Apparatus
 - Tillerred Apparatus
 - Wildland Fire Apparatus
 - Water Tender
2. Identify the prerequisites for certification
 - One of the following:
 - OSFM Fire Fighter 1 certification **or**
 - Appointment to the rank of Officer (Lieutenant or higher) or CAL FIRE rank of Fire Apparatus Engineer (Performing in an “acting” capacity does not fulfill this requirement.) **and**
 - Valid Class C Firefighter Endorsed **or** Commercial A **or** Commercial B driver’s license (per California Vehicle Code, Section 12804.11)
3. Identify the courses required for certification
 - FADO 1A: Fire Apparatus Driver/Operator (2015 or newer)
 - FADO 1B: Pumping Apparatus Operations (2015 or newer)
 - FADO 1F: Water Tender Operations (2015 or newer)
4. Identify the exams required for certification
 - No exams outside of class formative and summative testing
5. Identify the task book requirements for certification
 - Pumping Apparatus Certification Task Book (2024)
 - Water Tender Certification Task Book (2024)
6. Identify the experience requirements for certification (both required)
 - A minimum of one year full-time paid or two years’ volunteer or part-time paid experience in a recognized California fire agency with the primary responsibility as a Pumping Apparatus Driver/Operator **and**
 - A minimum of one year full-time paid or two years’ volunteer or part-time paid experience in a recognized California fire agency with the primary responsibility as a driver/operator on the apparatus for which the candidate seeks certification
7. Identify the position requirements for certification
 - The position requirement is met when the applicant fulfills the role of the specific duties as defined by the fire chief
8. Describe the certification task book process
9. Describe the certification testing process

- Not applicable

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Instructor Notes

1. None

Unit 2: Preventive Maintenance

Topic 2-1: Performing and Documenting Visual and Operational Checks

Terminal Learning Objective

At the end of this topic a student, given a water tender, tools and equipment, manufacturer specifications and requirements, maintenance and inspection forms, and AHJ policies and procedures, will be able to perform and document visual and operational checks on the water tank and other extinguishing agent levels (if applicable), pumping system (if applicable), rapid dump system (if applicable), and foam system (if applicable) in addition to those in 11.2.1 in NFPA 1010 (2024), so that the operational readiness of the water tender is verified.

Enabling Learning Objectives

1. Describe water tender systems and components
 - Foam system
 - Pumping system
 - Rapid dump system
 - Water tank and other extinguishing agent levels
 - Drop tank
 - Hydraulic lift assist system for portable tanks
2. Identify manufacturer specifications and requirements
3. Identify AHJ policies and procedures including documentation requirements
4. Use tools and equipment
5. Inspect a water tender
6. Recognize system or component 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 extinguishing agents may exist on a water tender?

Application

1. Given a water tender, manufacturer specifications and requirements, tools and equipment, and inspection forms, divide students into small groups and have each group perform a water tender inspection and present their findings.

Instructor Notes

1. None

CTS Guide Reference: CTS 16-1

Unit 3: Operations

Topic 3-1: Operating a Water Tender

Terminal Learning Objective

At the end of this topic a student, given a water tender, 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, applicable laws and regulations, and AHJ policies and procedures, will be able to operate a water tender so that the water tender is operated in compliance with all applicable AHJ rules and regulations and operational limitations of the water tender.

Enabling Learning Objectives

1. Recognize water tender resource typing
2. Identify water tender uses
 - Fill engines (water shuttle fill sites)
 - Nurse tender operations
 - Fill stationary water sources (dump sites)
 - Water roads (dust control and powdering out)
3. Explain the effects of braking reaction time and load factors on vehicle control
 - On road
 - Off road
4. Explain the effects of high center of gravity on:
 - Roll-over potential
 - General steering reactions
 - Speed
 - Centrifugal force
5. Identify AHJ policies and procedures
6. Describe the principles of:
 - Skid avoidance
 - Night driving
 - Solo driving
 - Shifting
 - Gear patterns
 - Following/braking distance
 - Water surge, tank structure, and baffles
7. Describe how to negotiate:
 - Intersections
 - Railroad crossings
 - Soft shoulders
 - Grade changes
 - Bridges
 - Turns
8. Identify weight and height limitations for both roads and bridges

9. Describe automotive gauges and their operation
10. Explain operational limits
11. Identify communication needs between water tender driver operator and:
 - Crew
 - Water supply/shuttle operator
12. Identify off-pavement water tender emergencies
13. Describe potential causes of water tender accidents
14. Operate passenger restraint devices
15. Maintain safe following distances
16. Maintain control of the water tender while accelerating, decelerating, and turning, given road, weather, and traffic conditions
17. Operate the water tender under adverse environmental or driving surface conditions
18. 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?
 - Flat and incline or decline driving?
 - Fair and adverse weather conditions?
7. What tactics can you use to maintain control when encountering uneven road surface?
8. What is the safe following distance on a mid-slope road?

Application

1. Given sample water tender incidents, divide students into small groups and have each group identify and discuss hazards and mitigation techniques and present their findings to the class.
2. Activity 3-1(a): Operate a Water Tender on Pavement
3. Activity 3-1(b): Operate a Water Tender off Pavement

Instructor Notes

1. None

CTS Guide Reference: CTS 17-1

Topic 3-2: Maneuvering and Positioning 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 hoses, will be able to maneuver and position a water tender at a water shuttle fill site so that the water tender is positioned, supply hoses are attached to the intake connections without having to stretch additional hose, and no objects are struck at the fill site.

Enabling Learning Objectives

1. Describe local procedures for establishing a water shuttle fill site
2. Identify obstacles frequently encountered at fill sites
 - Ground saturation
 - Animals
 - Diminished clearance
 - Limited egress and escape routes
 - Overhangs or trees
3. Describe how to correctly position a water tender at a water shuttle fill site
4. Describe how to mark the stopping position of the water tender
5. Describe how to locate the water tank intakes on the water tender
6. Describe how to attach supply hose(s) to the intake connector
7. Describe efficient water transfer from water fill site to water tender
 - Single water tender
 - Multiple water tenders operating independently
 - Multiple water tenders operating in coordination
8. Determine a correct position for the water tender
9. Maneuver the water tender into the correct position
10. Avoid obstacles to operations

Discussion Questions

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

Application

1. Given pictures of potential water shuttle fill site locations, have students discuss the pros and cons of each site.
2. Activity 3-2: Maneuver and Position a Water Tender at a Water Shuttle Fill Site

Instructor Notes

1. None

CTS Guide Reference: CTS 17-2

Topic 3-3: Filling a Pumping Apparatus

Terminal Learning Objective

At the end of this topic a student, given a water tender, a pumping apparatus, tools and equipment, and one or more supply hoses, will be able to fill a pumping apparatus so that fire flow is managed to meet incident demand.

Enabling Learning Objectives

1. Describe communication requirements between water tender operator and other resources
 - Turnaround time
 - Water levels
 - Capacity (GPM)
 - Additional resource needs
2. Describe how to correctly position a water tender at a pumping apparatus
 - Access for other units and keeping roadways clear
 - Securing equipment and tools
3. Describe how to locate the water tank discharges on the water tender
4. Describe how to pump water to the pumping apparatus
 - Appropriate pressure
 - Appropriate GPM
 - Hose diameter
5. Describe water tender operations at a pumping apparatus
 - Shuttling operations
 - Nursing operations
6. Determine correct position for water tender
7. Maneuver water tender into correct position
8. Pump to an apparatus

Discussion Questions

1. How do you determine water supply to meet fire flow needs?
2. When is it appropriate to use a nursing tender?
3. What are some limitations of nursing tender operations?
4. What is an appropriate pressure to pump to an engine?

Application

1. Given a water tender, a pumping apparatus, tools and equipment, and one or more supply hoses, have students fill a pumping apparatus so that fire flow is managed to meet incident demand.

Instructor Notes

1. Students will have previous experience with relay pumping from FADO 1B. Use your application activity to explore different water transfer scenarios.

CTS Guide Reference: CTS 17-5

Topic 3-4: Establishing a Water Shuttle Dump Site

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, hard suction hose, water transfer equipment, fire hose, and pumping apparatus, will be able to establish a water shuttle dump site 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 from one tank to the next.

Enabling Learning Objectives

1. Describe local procedures for establishing a water shuttle dump site
2. Describe 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 should you consider when setting up the traffic pattern for a dump site?
2. What types of surfaces should be avoided for a dump site?
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 dump site?
6. What are some considerations for refilling dip tanks during helicopter operations?

Application

1. Given a map, divide students into small groups and have each group select a location, diagram a dump site, and share their diagram with the class.
2. Activity 3-4: Establish a Water Shuttle Dump Site

Instructor Notes

1. None

CTS Guide Reference: CTS 17-4

Topic 3-5: Maneuvering and Positioning a Water Tender at an Established Water Shuttle Dump Site

Terminal Learning Objective

At the end of this topic a student, given a water tender, dump site, and portable water tank, will be able to maneuver and position a water tender at an established water shuttle dump site so that all of the water being discharged from the water tender enters the portable tank and no objects are struck at the dump site.

Enabling Learning Objectives

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

Discussion Questions

1. What are some safety considerations for using a rapid dump (non-pump) system?

Activities

1. Activity 3-5: Maneuver and Position a Water Tender at an Established Water Shuttle Dump Site

Instructor Notes

1. None

CTS Guide Reference: CTS 17-3

How to Read a Course Plan

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

Course Details

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

Required Resources

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

Unit

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

Topics

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

Terminal Learning Objective

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

Enabling Learning Objectives

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

Discussion Questions

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

Application

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

Instructor Notes

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

CTS Guide Reference

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

Skill Sheet

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