

Driving Aerial Apparatus

Terms

Write the definition of the terms below on the blanks provided.

1. Total Stopping Distance (157)
2. Reaction Distance (157)
3. Braking Distance (157)
4. Jackknifing (174)
5. Stimsonite® Markers (177)
6. Botts' Dots (177)

True/False

Write True or False on the blanks provided; if false, write the correct statements on the lines provided.

- _____ 1. Shift a manual transmission to a lower gear when climbing a hill. (151)

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- _____ 2. When driving an automatic transmission apparatus, the pressure placed upon the accelerator influences automatic shifting. (153)
- _____ 3. The process of braking fire apparatus to a standstill should be performed quickly. (154)
- _____ 4. It is SOP in some departments to shut down the engine rather than leave it idling for long periods of time. (155)
- _____ 5. A hot engine should idle 30 to 60 seconds before shutting down. (156)
- _____ 6. Front-brake limiting valve auxiliary braking systems were commonly installed on apparatus built before the mid-1970s. (161)
- _____ 7. Motor vehicles laws in most states and provinces provide that private vehicles must pull over to the left and yield until emergency vehicles pass. (163)
- _____ 8. If an intersection has no signal at all, the driver/operator should bring the apparatus to a full STOP. (163)
- _____ 9. Increasing the speed of an apparatus by only 20 mph (32 km/h) can decrease the audible distance of the siren by 250 feet (76 m) or more. (167)

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- _____ 10. Studies have shown that vehicles traveling with low-beam headlights on during daylight hours have fewer accidents. (169)
- _____ 11. Added weight decreases the stopping distance of a tillered vehicle. (172)
- _____ 12. The tiller operator should keep the trailer wheels parallel with the frame of the trailer and in a direct line with the tractor during normal street-driving operations. (173)
- _____ 13. When backing, steering the tiller wheels requires the same maneuvers of those used to steer the front wheels. (175)
- _____ 14. The lane change driving exercise is not required by NFPA[®] 1002. (180)
- _____ 15. Prior to becoming certified to drive emergency apparatus, a driver/operator should not demonstrate his/her ability to operate the apparatus on public thoroughfares. (182)

Short Answer

Write the correct answers on the blanks provided.

1. What is the first goal of the driver/operator? (144)

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2. List three basic guidelines of the driver/operator. (144)
3. What are the procedures for driving a manual transmission apparatus? (149-150)
4. List five guidelines for nonemergency traveling. (153)
5. List the factors that influence a driver/operator's ability to stop the apparatus. (157)
6. What are the most common causes of skids? (159)
7. List the guidelines to ensure safe passing. (164)

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8. List the factors of which tiller operators must be aware. (172)

Matching

Write the correct answers on the blanks provided.

- _____ 1. The angle formed by level ground and a line from the point where the rear tires touch the ground to the lowest projection at the rear of the apparatus (154)
- _____ 2. The angle formed by level ground and a line from the point where the front tires touch the ground to the lowest projection at the front of the apparatus (154)
- _____ 3. The angle formed by level ground and a line from the point where the rear tires touch the ground to the bottom of the frame at the wheelbase midpoint (154)
- A. Angle of approach
B. Angle of departure
C. Breakover angle

Multiple Choice

Write the correct answers on the blanks provided.

- _____ 1. What is generally the first step before starting the apparatus? (145)
- A. Fasten seat belt.
B. Turn on the vehicle battery.
C. Disconnect all ground shore lines.
D. Make seat and mirror adjustments.
- _____ 2. The engine should be started with the drive transmission in ____ gear. (147)
- A. first
B. second
C. drive
D. neutral

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- _____ 3. On a manual shift transmission, the starter control should be operated in intervals of no more than ___ seconds. (147)
- A. 15
 - B. 30
 - C. 45
 - D. 60
- _____ 4. If the oil pressure gauge does not indicate sufficient oil pressure within ___ seconds of starting the engine, stop the engine immediately and have it checked. (148)
- A. 5 to 10
 - B. 10 to 15
 - C. 15 to 20
 - D. 20 to 30
- _____ 5. Which of the following is a guideline for operating the clutch while driving? (151)
- A. Avoid vehicle roll back before engaging the clutch.
 - B. Abrupt operation of the clutch may cause the engine to lag.
 - C. Never attempt to start the apparatus moving while it is in a low gear.
 - D. When the driver/operator shifts gears, the clutch should be halfway disengaged.
- _____ 6. When traveling, choose a gear that allows the engine to operate at ___ rpm lower than the maximum recommended rpm. (154)
- A. 100 to 200
 - B. 200 to 300
 - C. 300 to 400
 - D. 400 to 500
- _____ 7. When an engine must be left idling for an extended period of time, set it to idle at ___ rpm. (155)
- A. 500 to 700
 - B. 700 to 900
 - C. 900 to 1,100
 - D. 1,100 to 1,300
- _____ 8. Which of the following is the distance the vehicle travels from the time the brakes are applied to the moment the vehicle comes to a full and complete stop? (157)
- A. Braking distance
 - B. Reaction distance
 - C. Stopping distance
 - D. Traveling distance

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- _____ 9. When an apparatus NOT equipped with an antilock braking system goes into a skid, what should the driver/operator do FIRST? (160)
- A. Release the brakes
 - B. Press the brakes down slowly
 - C. Jam on the brakes immediately
 - D. Turn the wheel so that front wheels face in the direction of the skid
- _____ 10. Which of the following auxiliary braking systems work in conjunction with the vehicle's conventional service brakes? (162)
- A. Engine retarders
 - B. Automatic traction control
 - C. Front brake limiting valve
 - D. Electromagnetic braking system
- _____ 11. It takes ___ times more distance for a vehicle to come to a complete stop on snow and ice than it does on dry concrete. (166)
- A. 1 to 5
 - B. 2 to 10
 - C. 3 to 15
 - D. 4 to 20
- _____ 12. Which of the following is NOT a guideline for using the inter-axle differential? (166)
- A. Always unlock the switch again when road conditions improve.
 - B. Remove foot from the accelerator when activating the inter-axle differential lock.
 - C. Activate the switch while one or more of the wheels are actually slipping or spinning.
 - D. Move the switch to the locked position when approaching or anticipating slippery road conditions to provide improved traction.
- _____ 13. At speeds greater than ____, an emergency vehicle may outrun the effective range of its audible warning device. (167)
- A. 30 mph (48 km/h)
 - B. 50 mph (80 km/h)
 - C. 60 mph (97 km/h)
 - D. 70 mph (113 km/h)
- _____ 14. When more than one emergency vehicle is responding along the same route, units should travel at least ___ apart. (168)
- A. 250 to 350 feet (80 m to 110 m)
 - B. 300 to 500 feet (90 m to 150 m)
 - C. 400 to 600 feet (120 m to 180 m)
 - D. 500 to 700 feet (150 m to 210 m)

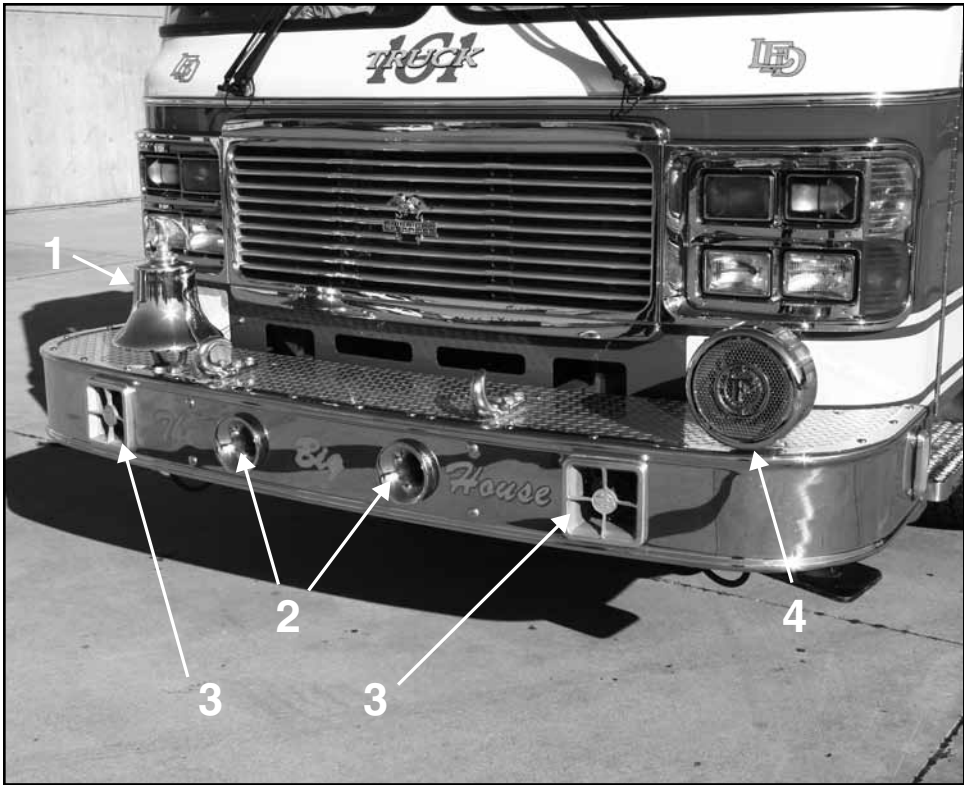
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- _____ 15. Which of the following statements regarding tiller operator guidelines is LEAST accurate? (174)
- A. Be alert to conditions on other streets ahead of the apparatus
 - B. Pay particular attention to trucks, buses and other large vehicles
 - C. Anticipate hazardous situations and plan compensating measures to prevent accidents
 - D. Tiller operator's hands must be in a 2 o'clock and 8 o'clock position during backing operations
- _____ 16. All fire apparatus training and testing should follow the requirements contained in NFPA®: (176)
- A. 472.
 - B. 1001.
 - C. 1041.
 - D. 1451.
- _____ 17. Which of the following driving exercises tests the driver/operator's ability to move the vehicle backward within a restricted area and to bring the vehicle to a smooth stop close to the rear wall? (177)
- A. Serpentine
 - B. Alley dock
 - C. Straight-in parking
 - D. Confined space turnaround
- _____ 18. Which of the following driving exercises simulates maneuvering around parked and stopped vehicles and tight corners? (178)
- A. Serpentine
 - B. Alley dock
 - C. Cross over backing
 - D. Diminishing clearance
- _____ 19. Which of the following driving exercises tests the driver/operator's ability to turn the vehicle 180 degrees within a confined space? (179)
- A. Serpentine
 - B. Ally dock
 - C. Diminishing clearance
 - D. Confined space turnaround

- _____ 20. Which of the following driving exercises measures a driver/operator's ability to steer the apparatus in a straight line, to judge distance from wheel to object, and to stop at a finish line? (179)
- A. Serpentine
 - B. Lane change
 - C. Straight-in parking
 - D. Diminishing clearance

Identification

Identify the audible warning devices on the lines provided.



- 1. _____
- 2. _____
- 3. _____
- 4. _____

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Skill Sheet 5-1

Objective 7: Start, idle, and shut down a fire service apparatus. (NFPA® 1002, 1.4.3, 4.3.1)

Student Name: _____ **Date:** _____

Directions

For this skills evaluation checklist, students will start a fire service apparatus, idle the apparatus for a given period of time, and shut down the apparatus.

Equipment & Materials

- One firefighter
- Fire service pumper, mobile water supply apparatus, or wildland apparatus
- Apparatus operator's manual

Task Steps

1. Disconnect all external electrical cords, air hoses, or exhaust system hoses from the apparatus.
2. Mount the apparatus, using appropriate steps and handrails.
3. Turn on the vehicle battery(ies).
CAUTION! Never operate the battery switch while the engine is running.
4. Check that the parking brake is set.
5. Place the transmission in neutral.
6. Turn on the ignition switches.
7. Operate the starter control.
8. Observe the apparatus gauges. Shut down the engine immediately if oil pressure gauge does not indicate a reasonable amount of oil pressure within 5 to 10 seconds.
9. Check air pressure gauge to ensure that adequate pressure is built up sufficiently to release parking brake and operate service brake.
10. Make driver safety and comfort adjustments: seat first and then mirrors and steering wheel position.
11. Don safety restraints.
12. Idle the engine for 3 to 5 minutes or until air pressure is built to appropriate level to operate service and parking brakes. Increase throttle to fast idle as necessary to speed buildup of air pressure.
13. Shut off the engine.
14. Turn the battery switch to the OFF position.
15. Reconnect external electrical cords, air hoses, or exhaust system hoses to the apparatus.

Skill Sheet 5-2

Objective 8: Drive a fire service apparatus. (NFPA® 1002, 1.4.3, 4.3.1)

Student Name: _____ **Date:** _____

Directions

For this skills evaluation checklist, students will drive a fire service apparatus.

Equipment & Materials

- One firefighter
- Fire service aerial apparatus
- Apparatus operator's manual

Task Steps

Four- or Five-Speed Manual Shift Transmission with a Single-Speed Rear Axle

1. Disconnect all external electrical cords, air hoses, or exhaust system hoses from the apparatus.
2. Mount the apparatus, using appropriate steps and handrails.
3. Turn on the vehicle battery(ies).
CAUTION! Never operate the battery switch while the engine is running.
4. Make driver safety and comfort adjustments; seat first and then mirrors and steering wheel position.
5. Don safety restraints.
6. Check that the parking brake is set.
7. Place the transmission in neutral.
8. Turn on the ignition switches.
9. Operate the starter control.
10. Observe the apparatus gauges. Shut down the engine immediately if oil pressure gauge does not indicate a reasonable amount of oil pressure within 5 to 10 seconds.
11. Check air pressure gauge to ensure that adequate pressure is built up sufficiently to release parking brake and operate service brakes.
12. Idle the engine for 3 to 5 minutes or until air pressure is built to appropriate level to operate service and parking brakes. Increase throttle to fast idle as necessary to speed buildup of air pressure.
13. Ensure that all riders are seated and wearing safety restraints and hearing protection.
14. Depress the clutch pedal with the left foot.
15. Depress the service brake pedal with the right foot.

16. Release the parking brake.
17. Place the gear shifter into a low gear.
18. Release the clutch slowly, taking care to avoid vehicle rollback before engaging the clutch.
19. Drive forward, depressing the accelerator appropriately.
20. Shift to a higher gear after proper speed or rpm is reached and after apparatus clears station and you have an unobstructed view of street and traffic conditions.
21. Shift to a lower gear, maintaining peak engine power and remaining in gear at all times.
22. Bring the apparatus to a standstill, braking smoothly and without skidding.
23. Activate engine brake and retarder per operator's manual.
24. Shut down the apparatus.

Automatic Transmission

1. Disconnect all external electrical cords, air hoses, or exhaust system hoses from the apparatus.
2. Mount the apparatus, using appropriate steps and handrails.
3. Turn on the vehicle battery(ies).
CAUTION! Never operate the battery switch while the engine is running.
4. Make driver safety and comfort adjustments; seat first and then mirrors and steering wheel position.
5. Don safety restraints.
6. Check that the parking brake is set.
7. Turn on the ignition switches located on the dashboard.
8. Operate the starter control.
9. Observe the apparatus gauges. Shut down the engine immediately if oil pressure gauge does not indicate any reasonable amount of oil pressure within 5 to 10 seconds.
10. Check air pressure gauge to ensure that adequate pressure is built up sufficiently to release parking brake and operate service brakes.
11. Idle the engine for 3 to 5 minutes or until air pressure is built to appropriate level to operate service and parking brakes. Increase throttle to fast idle as necessary to speed buildup of air pressure.
12. Ensure that all riders are seated and wearing safety restraints and hearing protection.
13. Depress the service brake pedal.
14. Release the parking brake.
15. Place the transmission into a gear for normal operation.
16. Drive forward, depressing the accelerator appropriately.
17. Proceed from the station after proper speed or rpm is reached and after apparatus clears station and you have an unobstructed view of street and traffic conditions.
18. Bring the apparatus to a standstill, braking smoothly and without skidding.
19. Activate engine brake and retarder per operator's manual.
20. Shut down the apparatus.

Skill Sheet 5-3

Objective 24: Perform various driving exercises.

Student Name: _____ **Date:** _____

Directions

For this skills evaluation checklist, students will perform four different driving exercises to the satisfaction of their instructor.

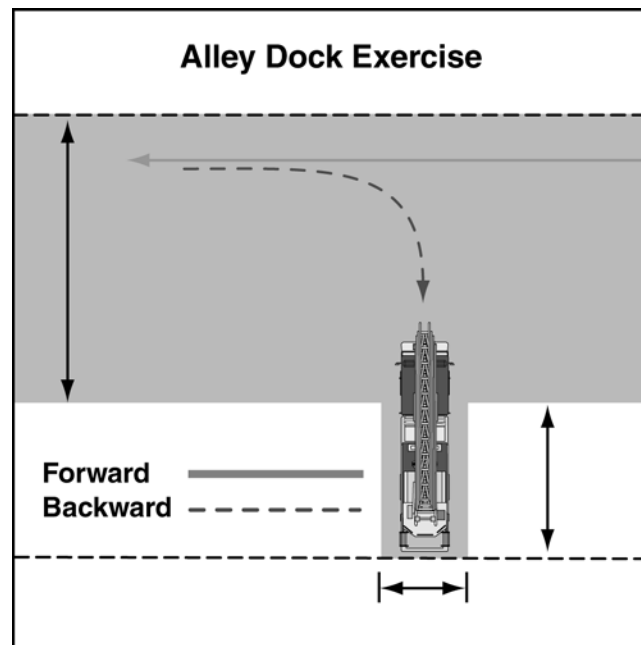
Equipment & Materials

- Two firefighters; one to operate the apparatus, one to serve as spotter
- Fire service aerial apparatus
- Apparatus operator's manual
- Fire department SOPs on backing fire apparatus
- Test area, such as parking lot with flat paved surface
- A number of traffic cones, 18 inches high

Instructor Notes

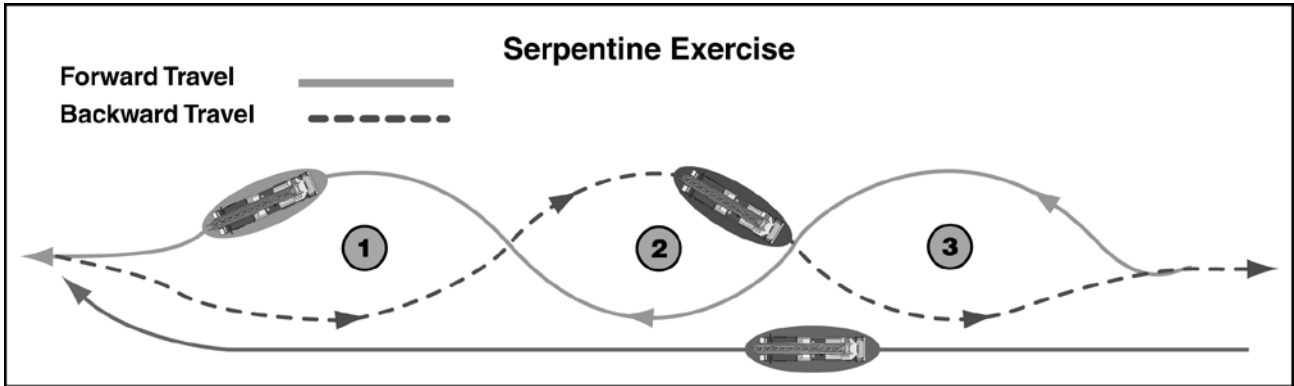
Before beginning this skill sheet, set up boundaries for four separate areas, one for each exercise.

Alley dock exercise — Test area should be set up with a restricted area 40 feet wide. Along one side and perpendicular, set up another area 12 feet wide and 20 feet deep.

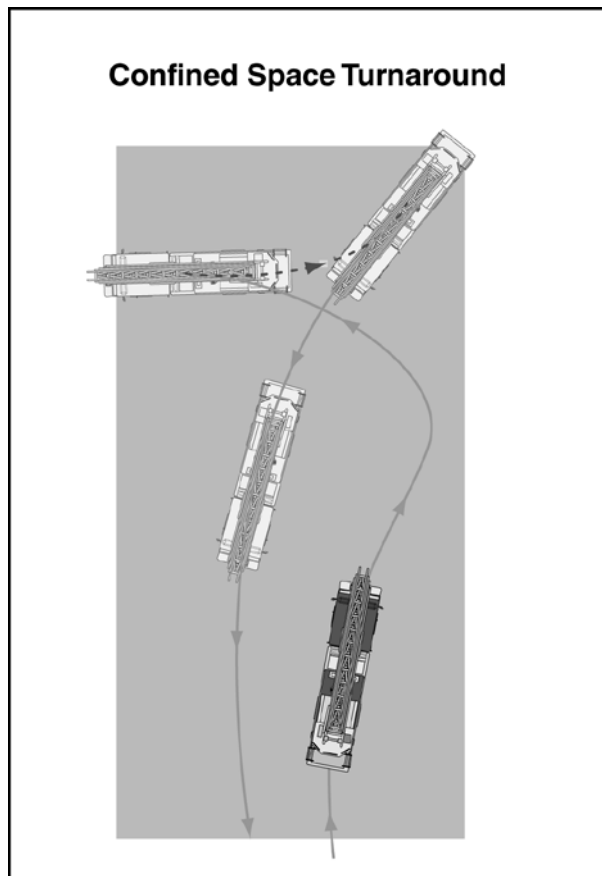


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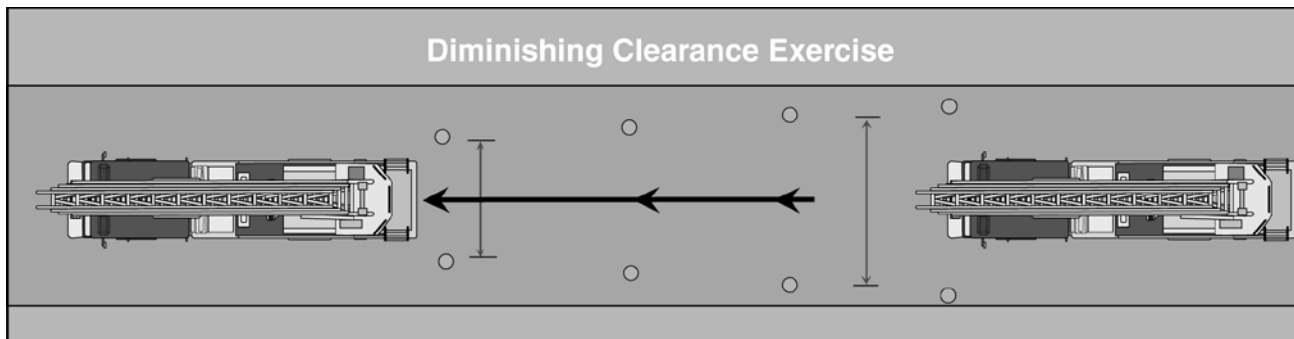
Serpentine course exercise — Test area should have at least three cones placed an equal distance apart in a line. These cones should be between 30 and 38 feet apart, depending on the size of the apparatus being used.



Confined space turnaround exercise — Test area should be at least 50 feet wide and 100 feet long, with an opening 12 feet wide.



Diminishing-clearance exercise — Test area should have two rows of cones that form a lane 75 feet long, narrowing from a width of 9 feet 6 inches to a diminishing clearance of 8 feet 2 inches.



Task Steps

1. Mount the apparatus, secure seatbelt, and start the apparatus.
2. Adjust all mirrors, sitting straight with both hands on the steering wheel and turning head from side to side until spotter can clearly be seen.

Alley Dock Driving Exercise

3. Place the apparatus in drive.

Manual transmission: Place gear shifter in a low gear.

Automatic transmission: Depress interlock on shifter and move it to D, or correct number or range of numbers, or depress pushbutton selector.
4. Drive the apparatus past the alley and bring the apparatus to a stop.
5. Place the apparatus in reverse.

Manual transmission: Place gear shifter in reverse gear.

Automatic transmission: Depress interlock on shifter and move it to R, or correct number or range of numbers, or depress pushbutton selector.
6. Back the apparatus slowly, making a left turn in reverse into the defined alley area.
7. Bring the apparatus to a standstill, braking smoothly and without skidding.
8. Repeat the exercise from the opposite direction.
9. Bring the apparatus to a standstill, braking smoothly and without skidding.

Serpentine Course Driving Exercise

10. Drive the apparatus along the left side of the cones in a straight line.
11. Bring the apparatus to a standstill just beyond the last cone.

12. Place the apparatus in reverse.

Manual transmission: Place gear shifter in reverse gear.

Automatic transmission: Depress interlock on shifter and move it to R, or correct number or range of numbers, or depress pushbutton selector.

13. Back the apparatus slowly, passing to the left of Cone 1, to the right of Cone 2, and to the left of Cone 3.

14. Bring the apparatus to a standstill, braking smoothly and without skidding.

15. Place the apparatus in drive.

Manual transmission: Place gear shifter in a low gear.

Automatic transmission: Depress interlock on shifter and move it to D, or correct number or range of numbers, or depress pushbutton selector.

16. Drive the vehicle forward slowly, passing to the right of Cone 3, to the left of Cone 2, and to the right of Cone 1.

17. Bring the apparatus to a standstill, braking smoothly and without skidding.

Confined Space Turnaround Exercise

18. Place the apparatus in drive.

Manual transmission: Place gear shifter in a low gear.

Automatic transmission: Depress interlock on shifter and move it to D, or correct number or range of numbers, or depress pushbutton selector.

19. Drive into the opening of the course, moving to one side or the other.

20. Begin the turning process, making as many direction changes as needed to turn the apparatus 180 degrees without striking any cones.

21. Drive the vehicle back through the opening of the course.

22. Bring the apparatus to a standstill, braking smoothly and without skidding.

Diminishing-Clearance Driving Exercise

23. Drive the apparatus forward, slowly, without touching any cones.

24. Stop the vehicle, smoothly, at a point 50 feet beyond the last cone.

25. Shut down the apparatus.

Skill Sheet 5-4

Objective 25: Perform various road tests in an aerial apparatus.

Student Name: _____ **Date:** _____

Directions

For this skills evaluation checklist, students will perform various road tests in an aerial apparatus. Each department should develop an established route for driver/operators to follow to complete this skill. This route should cover all of the usual driving conditions that can be expected within that jurisdiction. However, as a minimum, NFPA® 1002 states that any road test that leads to certification should include at least the following elements:

- Four left and four right turns
- A straight section of urban business street or two-lane rural road at least one mile (1.6 km) in length
- One through intersection and two intersections where a stop must be made
- A railroad crossing
- One curve, either left or right
- A section of limited-access highway that includes an on-ramp, off-ramp, and a section of road long enough to allow for at least two lane changes
- A downgrade that is steep enough and long enough to require downshift and braking
- An upgrade that is steep enough and long enough to require gear changing to maintain speed
- One underpass or a low-clearance bridge

Equipment & Materials

- One firefighter
- Fire service aerial apparatus
- Apparatus operator's manual

Instructor Notes

This skill sheet does not include step-by-step instructions to perform road tests, but does provide a checklist of each skill required to meet the standard. A pass/fail point system may be determined by the AHJ, if desired.

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Task Steps

1. Four left turns
2. Four right turns
3. Straight section of urban business street or two-lane rural road at least one mile (1.6 km) in length
4. One through intersection and two intersections where a stop must be made
5. A railroad crossing
6. One curve, either left or right
7. A section of limited-access highway that includes an on-ramp, off-ramp, and a section of road long enough to allow for at least two lane changes
8. A downgrade that is steep enough and long enough to require downshift and braking
9. An upgrade that is steep enough and long enough to require gear changing to maintain speed
10. One underpass or a low-clearance bridge