



ENGINEER CANDIDATE CERTIFICATION

ENGINE COMPANY OPERATIONS – MANIFOLD LAY

4" SUPPLY LINE, 200' 1 3/4" WITH SOF, 1 1/2" NOZZLE

GPM SETTINGS: 30,60,95,125,150,175 OR 200, HIGH RISE FOG NOZZLE @ 75PSI INCLUDING 7/8" SLUG TIP @ 50PSI AND SMOOTH BORE NOZZLE WITH STACKED TIPS

MAXIMUM TIME: 7:00

TASK #	TASK
1	Wear Proper PPE <ul style="list-style-type: none"> Wear appropriate clothing and footwear for incident Do not wear helmet in the cab
2	Check for crew and apparatus security/seat belts before apparatus moves <ul style="list-style-type: none"> All compartment and crew doors closed All crew seated and wearing seat belts Once Spring Brake is released, check for door and seatbelt warning lights
3	Turn on emergency lights and headlights (Opticom ON while driving Code-3) <ul style="list-style-type: none"> Must turn on headlights and all warning lights
4	Spot apparatus as directed by Rater
5	Keep brakes applied to prevent apparatus from rolling while equipment is being removed <ul style="list-style-type: none"> Parking brakes may be set but must release properly before laying the line Any movement while equipment is being removed is a safety violation CRITICAL ERROR
6	Wait until properly signaled to lay away from the hydrant <ul style="list-style-type: none"> Watch for signal through the driver's side mirror and listen for verbal signal to "Take it Away" Ensure all remaining personnel are seated with seat belts fastened CRITICAL ERROR
7	Sound forward motion signal, drive safely and correctly while laying hose 6'-8' away from curb <ul style="list-style-type: none"> One single horn blast to signal forward motion prior to moving
8	Drive safely and correctly while laying hose 6'-8' away from curb <ul style="list-style-type: none"> Hose should be laid 6'-8' from curb on the side of the road that the hydrant <i>is located</i> Cross hose over the incident (other) side of the road only <i>in front</i> of the incident location
9	Spot apparatus within 3 feet of cone as directed by Rater
10	Set both parking brake and front parking brake CRITICAL ERROR <ul style="list-style-type: none"> Time Starts
11	Place road transmission into "Neutral" <ul style="list-style-type: none"> Must be done before engaging the pump

TASK #	TASK
12	Shift pump selector from Road to Pump <ul style="list-style-type: none"> • Pump engaged indicator light illuminates
13	Shift transmission from “Neutral” to “Drive” <ul style="list-style-type: none"> • Listen for audible indicators signifying that the pump is engaged • Check both (Pump Engaged & OK to Pump) green indicator lights are on (Indicates ready to pump)
14	Exit Cab <ul style="list-style-type: none"> • Take helmet, portable radio, and other PPE
15	Ensure “Tank to Pump” valve is open
16	Engineer’s Panel <ul style="list-style-type: none"> • Check green light on pump panel is on and ready to pump • Open radio door • Turn volume up to audible level
17	Place wheel block on left rear tire, front and back, with collapsible wheel blocks locked open prior to throttling up CRITICAL ERROR <ul style="list-style-type: none"> • CORRECT PLACEMENT: <ul style="list-style-type: none"> • Forward and rear of wheel • Wheel blocks should be in complete alignment with tire • Square to tread
18	DO NOT supply water via apparatus water tank CRITICAL ERROR
19	Break 4” line, placing coupling under tailboard <ul style="list-style-type: none"> • Place hose from bed under tailboard after breaking connection on 4” hose line
20	Make connections away from apparatus pump panel <ul style="list-style-type: none"> • Pulling insufficient hose, or pulling incorrect hose to reach pump intake is an error • DO NOT pull hose from the hydrant to make up for any shortage to connect to the pump • DO NOT connect supply line to incorrect pump intake or discharge
21	Signal firefighter at hydrant for water <ul style="list-style-type: none"> • Utilize radio, voice, or hand signals • Check verbally and visually
22	Bleed air from supply line, close bleeder valve when air is removed
23	Open 4” intake slowly and completely. Green light will indicate valve is fully open
24	Close the Tank to Pump valve CRITICAL ERROR
25	Note the intake static pressure on the suction gauge
26	Verbally and visually, check for firefighter readiness and signal for water. Properly return signal
27	Open the correct discharge valve slowly and completely
28	Deliver correct calculated pump pressure for hose lay (see relief valve procedures below) <ul style="list-style-type: none"> • Pump pressure under or over 15psi of correct pressure is unacceptable CRITICAL ERROR • Use the discharge gauge to determine correct pressure reading because of possible differences between the main gauges and the discharge gauges

TASK #	TASK
29	Confirm correct pressure and water flow with personnel on hand line(s) <ul style="list-style-type: none"> Utilize radio, voice, or hand signals to verify pressure with personnel on the line(s)
30	Correctly set discharge pressure relief valve – Calculated pressure is Below 150 psi <ul style="list-style-type: none"> Adjust relief valve counterclockwise until pressure drops on the discharge gauge and amber light comes on indicating the Relief valve is open (listen for by-passing water) Gradually turn the relief valve clockwise until discharge gauge needle is steady at desired discharge pressure and amber light goes off indicating the relief valve is closed and set
31	Correctly set discharge pressure relief valve – Calculated pressure is Above 150 psi <ul style="list-style-type: none"> Adjust relief valve clockwise to raise pressure above calculated discharge pressure Deliver correct pump pressure Turn the relief valve counterclockwise until pressure drops on the discharge gauge and amber light comes on indicating the relief valve is open (listen for by-passing water) Gradually turn the relief valve clockwise until discharge gauge needle is steady at desired discharge pressure and amber light goes off indicating the relief valve is closed and set
32	Open recirculation line for pump cooling
33	Note the residual pressure on the suction gauge
34	Determine number of “Like Lines” that can be delivered
35	Monitor all Engineer panel gauges <ul style="list-style-type: none"> Touch and verbalize each gauge (RPM, Oil Pressure, Engine Water Temp, Etc.) Open the Engine Cooler valve to provide more engine cooling <u>only</u> if the engine overheats
36	Monitor water level in tank and fill tank if necessary <ul style="list-style-type: none"> May be done visually or by indicator lights Ensure tank is full Continue with operation after opening tank fill valve Compensate by increasing throttle for additional discharge (tank fill) being opened Shut down when full and compensate by reducing throttle for discharge (tank fill) being shut down
37	Check pump for overheating; visualize Overheat indicator light <ul style="list-style-type: none"> If cooling becomes necessary; open the tank fill to re-circulate water in the pump and adjust pump pressure if necessary In extended pumping operations this is an ongoing check High pump water temperature may lead to cavitation
38	Check pump for signs of cavitation <ul style="list-style-type: none"> Listen for sounds like gravel circulating in the pump When detected: <ul style="list-style-type: none"> Reduce discharge flow by gating down Reduce engine RPM Prime the pump to remove accumulated air and steam
39	Close all doors and secure loose equipment
40	Remove all kinks from hose lines, tighten leaking couplings
41	Visually check under apparatus for fluid leaks or other signs of failure
42	Notify Rater that the evolution is complete by CLEARLY CALLING “TIME”

MANIFOLD OPERATION – CRITICAL ERRORS Any critical error constitutes a failure**SAFETY VIOLATION**

Errors that could cause injury, be life threatening or cause property damage

EXAMPLES:

- Failing to set parking brakes and vehicle rolls after seat belt is removed from driver
- Fails to place Wheel Blocks
- Failing to recognize transmission is in ROAD and throttles up (Green light on dash and/or pump panel OFF)
- Running pump dry
- Opening discharge valve and charging hose before nozzle person is in ready position
- Opening discharge valve in a manner causing water hammer that unbalances the nozzle person or adversely effects the appliance to which the hose is connected
- A continuous discharge from an incorrect discharge without corrective action
- Opening an incorrect discharge wetting personnel or having water shoot the across street
- Runs tank out of water
- Excessively high engine RPM without corrective action
- Backing apparatus without assistance
- Vehicle rolls while equipment is being removed
- Attempts to supply water via the apparatus water tank
- Fails to close the Tank to Pump valve

Fails to complete hose lay as outlined**Fails to deliver water before exercise is stopped**

- If candidate indicates that the evolution is complete, the candidate cannot go back and correct the error of not delivering water
- Rater may stop exam for excess time

Pump pressure is not within 15 pounds of correct pressure

EXAMPLE: If calculated pressure is 150 psi, the candidate must have a pressure between 135 and 165. A pressure of 134 or lower, or 166 or higher is unacceptable.

*****If at any time, which could include prior to or after any portion of this evolution, the Rater determines that your actions create a hazard which may result in injury to any person, damage to property, other vehicles, or the apparatus you will be IMMEDIATELY disqualified from any certification process and asked to turn the apparatus over to the Rater*****

MANIFOLD HOSE LAY – Shut Down Procedures

1. Confirm with Rater on shut down of operations
 - Check verbally and visually
 - Utilize radio if necessary

2. Verbally and visually inform firefighter on the hose line of shutdown
 - Utilize radio, voice, or hand signals
 - Signal properly for shutdown and pick up (arms away from the body at sides. Then swing arms across the body in front. Repeat until acknowledged)

3. Throttle down to idle slowly
 - Before closing the discharge valve and disengaging the pump

4. Close discharge valve(s)
 - **Do not** continue to next step with this valve(s) open
 - Marked as an error if candidate continues to next step and has left the valve(s) open

5. Check water tank level, refill if necessary
 - Physically look in tank on top of the apparatus or for water discharging from overflow on tires
 - Do not rely solely on panel lights or gauges

6. Open Tank to Pump Valve

7. Close Intake Valve

8. Have hydrant shut down and secured
 - Bleed water pressure from line

9. Reset Discharge Pressure Relief Valve using approved method
 - Can be done using Tank to Pump valve as a water source and Tank Fill valve as a discharge

10. Close open valve (Tank to Pump, Tank Fill)
 - Must be done before entering cab to shut down

11. Close recirculation valve

12. Shift transmission to “Neutral”
 - Should be done early in shutdown procedure particularly if water has been shut off
 - **Do not** allow pump to run hot or while dry (empty)

13. Wait for 5 seconds to allow the transmission to wind down
 - Grinding of gears will occur if not done correctly. **Do Not** let gears grind

14. Shift pump from Pump to Road

15. Turn off all emergency lights if safe to do so

16. Shut down engine, if safe to do so

17. Turn on 4-way flashers

18. Relieve pressure on the pump
 - Can be done using Tank Fill or open a discharge/intake valve and corresponding bleeder valve

19. Secure all equipment and the apparatus (nozzles, hose, compartment doors, etc.)
 - All equipment should be returned to same compartment where it was originally found

TASK #	TASK
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| 20. | Perform Safety walk around <ul style="list-style-type: none"> • Verify all previous steps are completed and perform any that were missed • Wheel blocks must be securely stowed before entering cab |
| 21. | Notify Rater that the apparatus is "Road Ready" <ul style="list-style-type: none"> • Except for picking up wheel blocks and leaving on 4-way flashers |

NOTES:
