CITY OF CHICAGO FIRE DEPARTMENT

FIRE ENGINEER PROMOTIONAL PROCESS

STUDY GUIDE UPDATE

FOR THE PROFICIENCY TEST

December 15, 2016

TABLE OF CONTENTS

The following Appendices from the original September study guide are attached again for reference:

INTRODUCTION

This Study Guide Update is being issued to provide all candidates participating in the Fire Engineer Promotional Process of updated information about the Proficiency Test component that was not available at the time that the original study guide was issued in September. At that time, the Proficiency Test had not been fully developed. Now, more specific information is available to assist candidates in preparing for that component of the Fire Engineer examination process.

It is important to note that all of the appendix materials that were provided in the original September study guide remain exactly the same. **No changes** have been made to the Fire Engineer Task List, KSAO List, Recommended Reading List, or the relevant Operations and Maintenance Manual for the engine that will be used during the Proficiency Test. These materials, listed below, are attached again to this Study Guide Update. (Note that the Written Exam study materials, which were included in the original Appendix D, are no longer relevant for Proficiency Test component of the examination process.)

- **Appendix A** - list of critical job tasks for the Fire Engineer job
- **Appendix B** - list of knowledge areas, skills, abilities, and other characteristics (KSAOs) that are important for performing the Fire Engineer job
- **Appendix C** - Recommended Reading List of important reference materials that may be included in components of the Fire Engineer Promotional Process
- **Appendix E** - *2009 Spartan/Crimson Gladiator Classic Custom Pumper Operation and Maintenance Manual* for the engine that will be used in the Proficiency Test

The following sections contain information about the Proficiency Test reporting instructions, set-up, procedures, evaluation guidelines, day-of-exam instructions, and success tips. Most of the information remains the same as that presented in the September study guide. Important changes or additions have been highlighted to alert you to the new information.

The City wants each candidate for Fire Engineer to have an equal opportunity to demonstrate his or her capabilities. We encourage you to use the materials in this Updated Study Guide to help you prepare for the Proficiency Test, and we believe that you will find this information useful in helping you to do your best.

OVERVIEW OF THE FIRE ENGINEER PROFICIENCY TEST

PROFICIENCY TEST PROCEDURES

The Proficiency Test component of the Fire Engineer promotional process will require you to demonstrate your ability to operate an actual CFD front-line pumper to charge hose lines as you would if you were a Fire Engineer at an actual firefighting incident. The Proficiency Test will consist of a series of scenarios similar to the type that may be encountered on the fireground. You will be given specific instructions and information about the problem presented in each scenario. Then, you will be expected to take the appropriate steps and operate the engine pump panel controls to properly charge the line(s) as ordered for each scenario.

TEST SCHEDULING AND LOCATION

You will be scheduled for and given a Notice to Report for the Proficiency Test component of the Fire Engineer promotional process via email. Please be sure to read and follow the instructions on the Notice to Report carefully. Late arrivals to the test location will not be admitted. ***Be sure to report as scheduled!***

Reschedules of the Proficiency Test will be considered on an individual basis for candidates who are unable to attend their scheduled examination date and time because of a previously scheduled conflict or life event that cannot be rescheduled (i.e., wedding, graduation ceremony, birth of child), or who have a travel, medical, or similar emergency. Refer to the Notice to Report for more details and instructions regarding requests to reschedule.

The Proficiency Test will be held at the CFD Satellite Training Annex adjoining the quarters of Engine Company 63 (1440 E. 67th Street). Parking is limited to street parking; no onsite parking is available. Please enter the building through the front door of the training annex (west end of building) rather than through Engine 63's quarters. Upon arrival, candidates will be checked in for the examination.

TESTING CONDITIONS AND APPAREL

The Proficiency Test will simulate real-world conditions that Fire Engineers encounter on the job. ***Real engines will be used, and real water will be pumped and discharged***. The Proficiency Test will be held outdoors during winter months in Chicago. As when responding to real fire incidents on the job, you will have to deal with variables such as time of day, lighting, and weather conditions while performing operations during the Proficiency Test. As a result,

the conditions under which candidates take the test will vary. Environmental conditions, such as weather, time of day, lighting, etc., will be treated as irrelevant for testing purposes.

Candidates are allowed to report to the Proficiency Test in any manner of dress that they are comfortable in to perform the test exercises outside in the winter time. You do not need to wear your prescribed work uniform. Because water will actually be pumped and discharged during the test administration, and due to the fact that the weather conditions will vary, ***candidates may bring their turnout gear***. Wearing turnout gear is optional, but keep in mind that water will be flowing at the test site, and candidates may have to operate the pumper while standing in water. For this reason, candidates are ***advised to bring their boots, firecoat, gloves, or any other clothing or gear that they wish to wear during*** the Proficiency Test.

TEST ADMINISTRATION PERSONNEL

The Proficiency Test will be conducted under the overall supervision of the City's test administration contractor. That firm will provide proctors who will assist candidates with check-in procedures, provide up-front instructions and materials, monitor test scheduling, and so forth. During the actual examination, candidates will be led through the specific instructions and testing procedures by assessors who are specially trained by the test developer to administer the Proficiency Test scenarios. While you are being tested on the different scenarios, your performance will be monitored by three individuals serving in the following roles:

- One individual will serve as the **Examiner** and provide all of the test instructions and specific information about the leadouts requested in each scenario. This individual will play the role of your Company Officer while providing you with the instructions. This individual also will observe and record your performance, as required for scoring of the Proficiency Test.

- A second individual will serve as the **Controller** and observe your performance during the testing scenarios. This individual will record the actions you take in charging and shutting down the lines, as ordered, and document related readings, calculations, directions verbalized, and so forth, as required for scoring of the Proficiency Test.

- A third individual will serve as the **Safety Officer**. Because front-line pumpers will be in use, the potential exists for candidates to take actions that could threaten the safety of others or damage the apparatus. The Safety Officer will be a trained Fire Engineer who will monitor the actions of candidates to ensure that they do not inadvertently do something that could result in a danger to others or damage to the equipment. In the event that a candidate begins to take an action that could lead to such a situation, the Safety Officer will immediately instruct the candidate to stop. ***If***

instructed to stop, you must do so immediately in order to avoid a dangerous situation!

Note: The Safety Officer also will be responsible for performing actions in the cab of the engine (e.g., engaging the pump) that are required to operate the pumper during the testing scenarios. More information about this function is provided in the Proficiency Test instructions in the next section of this study guide.

PROFICIENCY TEST SET-UP

Below is a description of the CFD front-line pumper that will be used during the Proficiency Test. Because the scenarios used in the Proficiency Test will vary across candidates, information also is provided about the standard set-up of the engine for all scenarios and the guidelines that will need to be followed about discharge ports used, hose sizes, etc., to comply with the leadouts that are specified in the different scenarios.

ENGINE APPARATUS AND EQUIPMENT

The Proficiency Test will be administered using actual CFD front-line pumpers equipped with electronic pressure governors. All candidates will be tested using the same make and model of equipment, as follows:

- Spartan/Crimson Gladiator Classic Custom Pumper
- Equipped with Hale Fire Pump Model QTWO 150-23S (two-stage centrifugal pump)

Prior to testing, you should become familiar with information about this apparatus and equipment provided in the *2009 Spartan/Crimson Gladiator Classic Custom Pumper Operation and Maintenance Manual* (a copy was provided in Appendix E of the September study guide). You also should seek out opportunities for hands-on practice operating the pump panel and becoming familiar with the layout, function, and controls for this specific apparatus and equipment.

Note: You will not be given instructions on how to operate the apparatus/equipment during the test administration process or time to practice on the day you take the Proficiency Test.

STANDARD EQUIPMENT SET-UP AND GUIDELINES

The Proficiency Test is an assessment of your ability to effectively and efficiently charge and shut down the leadouts ordered by a Company Officer on the fireground. During the Proficiency Test, all candidates will be presented with three scenarios that present realistic fireground problems. In the role of the Fire Engineer, you will need to make calculations and

operate the pumper to provide appropriate discharge pressures for the leadouts specified by the Company Officer in each scenario. Due to the large number of candidates expected to take the Proficiency Test and the duration of the testing period, a number of variations on the three basic scenarios were developed to ensure that no candidates will know which specific leadouts they will be asked to execute prior to testing. The test developer worked with subject matter experts in the Chicago Fire Department to create scenarios variations that are of equivalent difficulty for all candidates.

During the Proficiency Test administration, you will have the specific instructions and information about the fireground problems presented in writing and verbally read to you by the Examiner playing the role of the Company Officer. The information will include the specific layouts requested, including the hose sizes, nozzles, and discharge ports to be used. You will then be expected to operate the pumper to deliver water through the designated port(s) at the appropriate discharge pressure(s) within a reasonable period of time.

Because multiple engines will be in use during the Proficiency Test, a large amount of water will be discharged at the exam administration site. To control the flow and pooling of discharged water, hose lines will be fed into large storm drains. As a result, the leadouts described by the Examiner will not be the same as the equipment set-up that you will actually see. Note that candidates will be examined on the basis of the leadouts described to them, not the actual lines into or from the apparatus. If the leadout presented by the Examiner indicates the discharge line is of a particular size and connected to a particular discharge port, a hose line of that size will actually be connected to that port. However, it may not be the same length or have the same nozzle or appliance connected to it as that described in the scenario. You must use the information provided in scenario to make the appropriate calculations and operate the pump panel controls to achieve the appropriate discharge pressures.

PROFICIENCY TEST EVALUATION

Candidate performance on the Proficiency Test will be evaluated in large measure on the ability to calculate the appropriate discharge pressures for the leadout(s) presented in the scenarios and to properly charge and shut down the lines as ordered. A checklist has been developed for use in recording the actions that you take during the Proficiency Test. The checklist will be completed by the Examiner and Controller during the test administration, and it will be sent to the test developer for scoring based on the scenario-specific guidelines developed with CFD subject matter experts and senior management. The scoring guidelines include point values associated with important actions that candidates must take to successfully implement the leadouts and shut-down procedures associated with each scenario. Such actions include:

- Verbalizing (saying out loud) the actions you are taking at each step as you work through the scenario

- Identifying correct intake and discharge ports to be used in the scenario
- Determining when it is appropriate to send water at safe pressure(s)
- Using a hose record to determine the length of hose in the specified leadout
- Calculating the appropriate discharge pressure to send based on the leadout
- Verbalizing discharge pressures at each stage when water is sent, including the initial (safe operating) pressure, the calculated discharge pressure based on specific leadout parameters, and the target pressure (rounded up or down, as appropriate)
- Manipulating the pump panel controls to achieve and maintain the appropriate discharge pressure(s) as indicated by the gauge readings
- Accomplishing the task (i.e., sending water for the specified leadout) within the time limit allowed
- Verbalizing instructions to the Safety Officer at points needed to perform necessary operations inside the cab of the engine (i.e., engage the pump) or during shut-down operations (i.e., open specific drains)
- Verbalizing other instructions or information that you would need to share with others involved in the fireground scenario (e.g., instructing the Hydrant Person to send water when you are ready; communicating important information to the Company Officer about water conditions)
- Following procedures to send water and perform shut-down in the prescribed order, to the extent that timing of certain steps or actions is important

TEST TIMING

The Proficiency Test scenarios will mimic real fireground constraints with respect to time. That is, water must be sent within a reasonable period of time to ensure the safety of the company members and an effective attack on the fire. The time frames set for the scenarios are realistic, and part of your score will be based on your ability to send water within the specified time frame. However, you will not receive a higher score for doing it faster (e.g., sending water within 1 minute rather than the 2 minute time limit).

The test time limits for individual parts of the scenarios are either **2 minutes** or **2 minutes and 15 seconds**. You must make a verbal statement ("I am finished." or "I am done.") to indicate to the assessors when you are finished with each timed portion of the scenarios. The clock will continue to run until you say out loud, "**I am finished (or done)."** If you have not finished with a scenario within the specified time limit, you will be allowed to continue until you indicate that you are finished, up to a time that is double the time limit (either 4 minutes or 4 minutes and 30 seconds). If you still have not indicated that you are finished at that time, you will be stopped by the Examiner and prompted to move on to the next part of the test.

INSTRUCTIONS FOR THE PROFICIENCY TEST

This section of the Study Guide provides general instructions that you will be asked to follow during the Proficiency Test administration. On the date of testing, the assessor will give you written and verbal instructions about the fireground problems, requested leadouts, and other relevant information about the specific scenarios during the test administration. Additional information related to test administration practices may also be provided by the proctor on the day of testing.

The test instructions (such as those shown below) will be provided to you in writing and read aloud to you by the Examiner at the start of the Proficiency Test. If you have any questions, you should ask them to be sure you understand all of the instructions. Questions will be answered by repeating information contained in the instructions to ensure all candidates are given the same information during test administration.

PRELIMINARY INSTRUCTIONS

The Fire Engineer Proficiency Test includes a series of three scenarios that represent common fireground situations encountered by Engineers.

- One scenario involves a Single Line Leadout
- One scenario involves Quick Water followed by Second Line
- One scenario involves Two Master Stream Leadouts

For the Proficiency Test, you will be a Relief Engineer working today with a fictitious Engine Company. The Examiner will act as the Company Officer and give you specific directions about the leadouts requested and other relevant instructions at each stage of the fireground scenarios. Be sure to listen to the instructions carefully.

For testing purposes, you will not be operating any of the controls inside the engine cab. The Safety Officer will engage the pump at your direction. At the start of each scenario, you should assume that you have already put the engine in Neutral and set the maxi brake. The wheels have been chocked, and the safety hitches have been secured to the hose lines. The radio has been switched from inside the engine cab to the remote/pump panel location.

For testing purposes, regardless of the actual temperature, assume that today it is **45 degrees** outside, which does **not** require cold weather operations procedures.

Also assume that when you inspected the engine at the beginning of the shift, you found that the front soft suction is inoperable. Therefore, the engine is set up so that water intake from the hydrant is hooked up to the Officer's side intake. To use hydrant water, you will need to walk around the front of the engine to the Officer's side to open that intake port.

At the start of your exam, the engine's tank will be full. For scenarios that begin when you are already connected to the hydrant and have a positive source of water flowing to the engine, you should not use any water from the tank. For the scenario that requires the use of tank water first, you will need to instruct the Hydrant Person to send water at the time you request it after getting the line charged with tank water. In any case, you must ensure that you have a supply of water before the pump is engaged.

The hoses used for all of the leadouts described in the Proficiency Test will be connected to the following discharge ports during all of the scenarios:

- Crosslay #1
- Drivers Side Rear Discharge #3
- Passengers Side Rear Discharge #4

You will be reminded which specific discharge ports the hoses are connected to for each scenario during the exam. You should not open any of the other discharge ports during the test.

You have one (1) minute to familiarize yourself with the pump panel and how it is set up to start. At the start of each scenario, the pump controls will be reset to these same settings. Do not make any adjustments to the panel until you hear the specific instructions for each scenario.

When we start the fireground scenarios, your responsibility as the Engineer is to implement the leadouts ordered by the Company Officer. You must ensure that you understand the leadout instructions and then provide water through the appropriate discharge port at the proper pressure within a reasonable time. You will be told the time limits for each scenario during the specific instructions.

For testing and evaluation purposes, **you must talk out loud** as you work through the scenarios and clearly state what actions you are taking. You do not need to explain why you are doing everything; you only need to state what actions you are taking. We realize that you would not have to do this in a real fireground situation. However, for testing purposes, it is critical that the assessors can identify and document what actions you are taking. Some actions, such as checking the reading on a gauge, will be difficult for them to verify if all you do is glance at it. Thus, you will need to say out loud that you are checking the reading on a

specific gauge. Similarly, you should make it clear when you are opening or closing various ports fully or partially. Remember, to receive a score for certain actions, there are points in each scenario where you will be required to verbalize (say out loud) specific information to receive credit.

- The Safety Officer will work the controls in the engine cab, so you must verbalize any instructions that you need to give to the Safety Officer (for example, to engage the pump).

- You must verbalize instructions or information that you would give to others (such as the Hydrant Person or the Company Officer) with whom you would be communicating if these were actual fireground scenarios.

- You must indicate which gauge(s) you are reading to check relevant pressures (e.g., intake, compound, master discharge, specific discharge port) by stating which gauge you are referring to or pointing to it.

- To reduce the amount of water accumulating on the ground during testing, you will not actually open any drains. At points where you would open drains during the scenarios, you should verbalize (but not take) related actions.

- It is very important that you verbalize all of the discharge pressures (e.g., initial safe operating pressures, actual calculations, and target pressures rounded up or down) that you are intending to send at each point when you send water for a leadout. Use the field hydraulics (flow memory) method that is endorsed by the Chicago Fire Department and presented in the Engineer's Manual. When making calculations for elevation change, use 5 pounds per floor (or 10 feet).

- You must make a verbal statement to indicate to the assessors when you are finished with each timed portion of the scenarios. The clock will continue to run until you say out loud, "**I am finished."** The Examiner will not interrupt to ask if you are finished or stop you at the time limit until you have verbally indicated that you are finished.

Please speak clearly and at a volume that can be heard by the assessors and the Safety Officer over the noise of the engine. Note that the Examiner may ask you to repeat verbalized information if the assessors could not hear what you said.

The Safety Officer will step in and stop the test if pump cavitation occurs or if at any point candidates' actions or equipment malfunctions occur that could cause damage to personnel or equipment at the scene. If this happens, you will be told how to proceed with the test. Candidates will not be penalized for equipment malfunctions (e.g., mechanical problems with the engine, hydrant issues, etc.). The Safety Officer will make any adjustments necessary to re-start or continue your examination under normal testing conditions.

SCENARIO-SPECIFIC INSTRUCTIONS

At the beginning of each Proficiency Test scenario, you will be presented with the specific instructions for that leadout and/or shut-down. Again, instructions will be provided in writing and verbally by the Examiner. Examples of the instructions are provided below.

EXAMPLE LEADOUT INSTRUCTIONS

As you work through the scenario, state out loud the actions you are taking and the gauges you are checking as you work through the scenario. Also state out loud any instructions or information you would give to others and the discharge pressures at each point when you send water, including the initial, calculated, and target discharge pressures. Remember to announce "I am finished" when you have completed your actions for this scenario.

Your engine is the first responding company to the scene of a fire. *(You will be given additional details about the scene here, such as fire location and elevation, if relevant.)* At this time, you are already connected to the hydrant, and you have a positive source of water flowing to the engine. *(Or you may be instructed to use tank water first.)*

As your Officer, I direct the use of *(hose size, nozzle, discharge port will be given here)*. The hose length (butt) number connected to the engine is # *(you will be given the number for reference in the hose record)*. When I give the signal, you must determine the appropriate pump discharge pressure and charge the line within 2 minutes and 15 seconds.

Are you ready? Begin.

EXAMPLE SHUT-DOWN INSTRUCTIONS

You are now done with operations for this incident. The Company Officer tells you to shut down. Please take the steps necessary to put the engine back in service. Remember that you must verbalize the actions you are taking and any instructions to the Safety Officer for steps that require actions taken in the cab. You have 2 minutes to complete the shut-down procedures.

Are you ready? Begin.

PREPARATION STRATEGIES FOR THE PROFICIENCY TEST

In order to do well on the Proficiency Test, there are two things that candidates must be able to do. The first is to understand the leadouts being described and to calculate the necessary discharge pressures. If you have prepared well for the Written Examination, this aspect of the Proficiency Test should not present a significant new challenge.

The second thing candidates must be able to do is to operate the pumper in order to effectively and efficiently charge and shutdown the lines ordered by the Company Officer. If you are not already familiar with the theory and procedures for fire pump operation, now is the time to prepare. You should study the related materials (listed in the Recommended Reading List in Appendix C of the September study guide) and practice developing or using related knowledge and skills.

OPERATING A PUMPER

HANDS-ON EXPERIENCE

Candidates should become familiar with the CFD approved procedures for pump operations. For most leadouts, there is a sequence of events that must be followed in order to operate the pumper appropriately. Candidates also should take steps to gain hands-on experience working a pumper. If you work in a house with an engine, talk with the Engineer and study the apparatus closely. Become familiar with the location of the various gauges, valves, and controls, and the function of each. Learn the location of all the intake and discharge ports. Learn about the electronic pressure governor and how it affects pump operations. And most importantly, work the pumper and learn how to properly charge and shutdown one or more lines. Speak with your Company Officer about obtaining training on pump operations.

SIMULATION AND GROUP PRACTICE

In all likelihood, candidates will not be able to practice on real pumpers as much as they might like. You should take opportunities to talk with current and former Fire Engineers about other methods of practice they used and ways they prepared for the proficiency examination component. In the past, some candidates created full-size cardboard mock-ups of the pump panels with the gauges, valves, and controls drawn in the proper locations. They then practiced using the cardboard display panels and went through the motions of opening the intake and discharge ports, and throttling up the engine. Although this approach does not provide a true hands-on experience of working the pumper, it helps to train candidates in the sequence and motions that are necessary to operate a real pumper. This approach is often best done with a

small group of fellow candidates so that several people can provide feedback on the simulated performance. For each practice round, one person can describe the leadout to the candidate at the panel. The candidate should then quickly calculate the proper discharge pressure and then go through the motions as though he/she were actually opening the appropriate valves and setting the proper discharge pressures. The candidate would benefit from verbalizing what he/she is doing at each step of the process, so that the others can provide constructive feedback on his/her performance, especially during the early stages of preparation. It is also important to practice verbalizing the information that will be required during the actual exam, such as the calculated and target discharge pressures, instructions to the Safety Officer about engaging the pump and opening drains, and providing any other information that an Engineer would communicate to others during fireground operations, such as the Hydrant Person or the Company Officer who may be inside the fire structure.

Your group should speak with others who have taken previous Fire Engineer proficiency tests to get an idea of the kinds of leadouts that were used and then generate a set of your own with which you can practice. Vary the hose size, hose lengths, nozzles and appliances used in the leadouts. Practice using single lines, multiple lines charged and shut down simultaneously, and multiple lines charged and shut down sequentially. Also practice using different elevations and connectors.

CONTROLLING ANXIETY

Some candidates experience anxiety when they take the Proficiency Test. In most cases, the anxiety stems from wanting to do well, but fearing that they will make a mistake while being observed. Below are some techniques that you can use to help control test anxiety.

PRACTICE, PRACTICE, PRACTICE…

Working with a group of fellow candidates who are observing you while you put the pumper (or cardboard mock-up) to work will help acclimate you to that situation and lessen the anxiety you might otherwise feel. It is better to make a mistake in front of your practice group, when the consequences aren't serious and you still have time to learn from any mistakes that might be made. Your group can give you feedback and guidance to correct the mistake. And the more you practice, the more proficient you will become. Studies have suggested that performing well-learned behaviors in front of others actually improves the quality of the performance. Practice until the sequence and motions of operating the pumper are well-learned and automatic. This will give you greater confidence and decrease the likelihood of experiencing anxiety during the actual Proficiency Test administration.

VISUALIZATION

Another technique to improve performance and control anxiety is one often used by professional athletes and performers. While lying down or resting in an easy chair, they allow their body to relax by first taking a series of slow, deep breaths. Once relaxed and comfortable, they visualize themselves going through the motions, step by step, of their target activity (e.g., hitting a baseball, performing on stage). The goal is to visualize doing the activity effectively and flawlessly. Doing this repeatedly over several sessions helps to create a very clear mental picture of what good performance looks like. When called upon to actually carry out the activity, mind and body tend to work in coordination to achieve it. Try doing this to prepare for the Proficiency Test. Visualize yourself approaching the pumper in a confident and assured manner, listening to the leadouts being described by the Company Officer, quickly and accurately calculating the discharge pressures, and smoothly and flawlessly charging and shutting down the lines as ordered. Mentally go through the whole process step by step, from the time your name is called for testing, through to the point that you complete the Proficiency Test. Take your time and be very specific in your visualization. Don't just form a big picture of yourself operating at the pump panel. Rather, visualize yourself doing each of the steps (e.g., verbalizing instructions to open the intake valve, checking the hose record book, making the calculations, opening the proper discharge port, throttling up, checking the gauges) in proper sequence from beginning to end.

MOCK TEST SESSION

Candidates in the practice group should hold mock Proficiency Tests. Try to mimic the real test situation as closely as possible. The candidate should be dressed in the same type of clothing that he/she plans to wear on the day of the test (either turnout gear or other cold weather garments, boots, gloves, etc., as preferred), and escorted to the pump panel. The individual taking the role of the Examiner should describe a leadout, then the candidate should take the necessary steps to properly and quickly charge the line(s). The individual serving as the Controller should closely monitor and record the candidate's actions, but not provide any feedback at this point. The candidate should talk through the steps as he/she works through them and clearly state the actions he/she is taking and the specific gauges that are being checked. The candidate also should say out loud other information that will be required during the actual exam. This information includes any instructions he/she would give to the individual serving as the Safety Officer about engaging the pump and opening drains. It also includes stating the discharge pressures at each stage when water is sent, including the initial (safe operating), actual calculated, and target (rounded up or rounded down) discharge pressures. And finally, the candidate should state any other information that an Engineer would communicate to others during fireground operations, such as the Hydrant Person or the Company Officer who may be inside the fire structure. The Controller should record the

intended discharge pressures as well as the actual discharge pressures achieved from reading the pressure shown on the appropriate gauge at the end of the time limit for each scenario.

Throughout the mock test session, the Examiner should present three different leadout scenarios. In between scenarios, instruct and observe the candidate shutting down and taking the steps necessary to put the engine back in service to be ready for the next scenario. Once the entire simulation is finished, at this point, the group of individuals who observed the candidate might wish to provide feedback regarding what the candidate did well and what, if anything, could be improved. Following this procedure should help to make the real Proficiency Test seem much more familiar and less threatening than might otherwise be the case.

SUCCESS TIPS FOR TAKING THE PROFICIENCY TEST

Keep these valuable test-taking rules in mind, and try to put them into practice on the day of the Proficiency Test, to help you do your best.

TIP 1: BE CALM AND CONFIDENT

Remaining calm and confident will help you think clearly, keep your composure, and perform at your best while working your way through the testing scenarios. Each time a scenario is presented, take a deep breath and calmly work your way through it just like you practiced. Speak clearly when you verbalize instructions, discharge pressures, or other information. Present what you know in a confident manner.

TIP 2: MAKE SURE YOU UNDERSTAND THE DETAILS

Listen carefully. Be sure that you understand the scenario instructions and each part of the problem that is presented. Think about exactly what you are being asked to do before taking action. If you are unsure you heard the leadout correctly or you want to confirm any details, you may ask the Examiner to repeat it.

TIP 3: DO NOT READ INTO THE ASSESSORS' BEHAVIOR

It is important not to focus too much attention on the reaction of the assessors (i.e., the Examiner, Controller, and Safety Officer) while you are taking the Proficiency Test. Focusing on their reactions may make you more nervous and distract you from listening carefully to the scenarios or responding effectively to the problems. After you complete each scenario, do not b be concerned that the assessors may not say anything or show any expression on their faces. To be fair to all candidates, they are instructed not to give any indication as to how candidates are doing on the test. You should not expect any feedback from them at all. In general, be

professional in all of your interactions with the assessors. Treat them as you would treat your Company Officer and the other members of your company. Make eye contact, listen carefully, and speak directly to them.

TIP 4: THINK AND RESPOND AS A FIRE ENGINEER

The purpose of the promotional process – both the Written Examination and the Proficiency Test – is to determine your level of knowledge, skill, and ability in areas that are crucial for effective performance as a Fire Engineer. When responding to the testing scenarios, assume the role of an Engineer and respond as the individual who is responsible for properly charging the lines that will allow the other company members to perform their work safely and effectively. Assume a professional presence and demonstrate your ability to turn your knowledge into effective action while performing the Engineer's important job duties.

APPENDIX A

FIRE ENGINEER CRITICAL JOB TASKS

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

List of Critical Tasks

A. Morning Equipment Check

1. Upon reporting for duty, notifies Company Officer of arrival and follows proper relief procedures (e.g., PPE, radio, SCBA, Air Purifying Respirator and canister inspections) in order to assume responsibilities for the shift.
2. At the beginning of the tour of duty, becomes familiar with the status of apparatus, hose, appliances, and nozzles by requesting an oral description of the activities during the previous tour of duty from the off-going Engineer and/or by reviewing the journal entries from previous shifts in order to identify and correct problems that may affect engine operations.
3. Inventories and verifies hose, appliances, and nozzles on the apparatus against the Engineer's hose record book to ensure all equipment is present, functional, and properly stored, and that the apparatus is fully equipped.
4. Inspects condition of the apparatus (e.g., fuel level, other fluid levels, air brake function, lights, tire pressure, booster tank water level, presence of water in the pump, physical damage, air pressure, all equipment secured) by conducting a visual walk-around and takes corrective action as necessary in order to ensure the apparatus is fully prepared for duty.
5. When applicable for the apparatus, conducts battery test (i.e., checks gauge), maintains diesel exhaust regeneration system, and maintains apparatus air brakes (i.e., bleeds lines to release moisture/condensation, if required) at 0800 and 2000 hours to ensure safe and proper functioning of the apparatus.
6. Inspects apparatus mounted radio(s) and portable radio to ensure proper operation, zone/channel selection, and scan list setup necessary to effectively transmit, receive, and relay information in accordance with Chicago Fire Department guidelines.
7. Verifies location and method of operation of all controls when working with unfamiliar apparatus (e.g., new or replacement apparatus, relief assignment) in order to ensure quick and accurate apparatus and pump operations.
8. Familiarizes self with all tools and equipment and their compartments or storage locations on the apparatus.
9. Exercises all valves and drains to verify and ensure proper operation.
10. Starts apparatus, drives onto apron, and allows the engine to warm up to operating temperature to ensure the apparatus is operating properly and is prepared for responses to calls for service.
11. Conducts morning pump test by checking relief valve or electronic pressure governor operation, automatic shut-off switch, road-to-pump switch, transfer valve position, condition of intake ports and screens, foam proportioning system, etc., and takes action as necessary and appropriate for the season, in order to ensure that the apparatus is fully prepared.

12. Secures apparatus, places on charge, and attaches exhaust system when available, after completing the morning equipment checks.
13. Test drives spare or unfamiliar apparatus, with the supervision of the Company Officer, to become familiar with apparatus, so as to be fully prepared for driving and operational responsibilities.
14. Notes any construction or other occurrences (e.g., street closings, hydrant shutdowns) that may affect operations during the tour of duty by requesting information from others and by reviewing journal entries in order to develop alternate routes, as necessary, for use when responding to calls for service.
15. Familiarizes self with company personnel assignments (e.g., who has hydrant duty) during roll call in order to be able to quickly provide information to the appropriate Firefighter(s) during incident responses.
16. Prepares SCBA face piece for use by sanitizing, visually inspecting for damage, and physically testing for a tight seal when worn, in order to comply with departmental regulations and to ensure its readiness and effectiveness for use if required.
17. Participates in morning air mask drill when ordered to do so by visually inspecting, physically testing, and donning and doffing the SCBA equipment in order to comply with departmental regulations and ensure readiness for use.
18. Informs the Company Officer of the results of the morning check by describing the status of the apparatus and its readiness.
19. Records all hose changes and hose replacements by updating the Engineer's hose record book and informs the Company Officer of any changes made in order to keep the Company Journal and Company Hose Record up to date.
20. Reviews maps, talks to Company Officer and other personnel, monitors road construction, water shut-offs, and unusual building occupancies (e.g., hospitals, schools, nursing homes) in still district in order to maintain/develop familiarity with the area and to facilitate effective response to alarms.
21. Monitors equipment, tools and supplies in work areas of the physical plant (e.g., hose tower, basement, apparatus floor) to ensure items are functional and properly stored and these areas are clean for the safety of members and effective accomplishment of duties assigned by the Company Officer.

B. Incident Response

22. Monitors alarm terminal and speakers while in quarters to verify type and location of alarm, time received, and other responding units.

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

List of Critical Tasks

23. Reports to apparatus promptly when alarm is received to ensure a quick response and to verify all compartments are closed, all charging equipment is unplugged and secured, and equipment carried on the exterior of apparatus is secured.
24. Verifies that all company personnel are seated and properly belted before moving the apparatus by waiting for the “all clear” signal from the Company Officer in order to help ensure the safety of personnel while in transit.
25. Drives the apparatus to the incident site, obeying all Chicago Fire Department and other applicable guidelines and procedures for safe operation of apparatus during emergency operations.
26. Upon arrival, locates the apparatus as ordered by the Company Officer in order to obtain desired position for access to the incident site and water source.
27. Prepares apparatus for pumping by following Chicago Fire Department procedures (e.g., switch from road to pump, switch to rear radio operation) in order to begin pump panel operations.
28. Implements appropriate course of action as ordered by the Company Officer (e.g., quick water, lead-outs, foam, Siamese connections), so that the appropriate water pressures can be delivered.
29. Works with hydrant person to connect to the appropriate hydrant based on the nature of the incident and the lead-out ordered by the Company Officer in order to rapidly provide the appropriate stream for control of the incident.
30. Informs the hydrant person when the engine is prepared to receive water through the use of portable radios, hand signals, or other type of signal in order to initiate and provide an uninterrupted flow of water to company personnel and to minimize the potential for damage to the engine.
31. Adjusts the engine discharge pressure appropriately based on hose lead-out, nozzle type and size, and appliance in order to ensure safety and fire fighting effectiveness.
32. Observes all necessary safety precautions during incident operations (e.g., securing hose to apparatus using Engineer’s hitch, setting relief valve, chocking wheels) to help ensure the safety of equipment and all company personnel, including self.
33. Monitors communications during incidents for any transmissions and responds by relaying information or taking other actions as directed.
34. Remains alert for potential problems by monitoring incident operations and progress and informs the Company Officer when situations occur (e.g., potential loss of water, fire communication) which could threaten the safety of Firefighters or the control of the incident.
35. Monitors all gauges (e.g., oil pressure, water discharge pressure, compound gauge, engine temperature, fuel level, tachometer) during engine operations to ensure efficient operation and to identify and correct or report problems, as appropriate, if they occur.

36. Keeps track of all equipment assigned to apparatus when at an incident site (e.g., nozzles, hose, fittings) in order to safeguard against theft and to help ensure that any equipment borrowed by other companies will be returned upon termination of the incident.
37. Assists in the performance of other duties as may be ordered when engine is not in operation in order to contribute to effective, coordinated efforts at the incident site.
38. At the termination of the incident, assists in the recovery and inventory of all company tools, equipment, and hose; monitors the bedding of hose; and updates the Engineer's record book accordingly (e.g., date, location, nozzles used, damaged hose) in order to prepare the apparatus for return to service.
39. Reports the condition of the apparatus, appliances, nozzles, fittings, intake strainers, and hose to the Company Officer at the close of each pumping operation in order to keep the officer informed of the engine's response capability.
40. Upon return to quarters, pauses upon entry for exhaust system to be attached, secures the apparatus (i.e., applies maxi-brake), and places on charge.
41. Upon return to quarters, re-inspects the apparatus, conducts an inventory of all hose and all pump-related equipment (e.g., fittings, nozzles), takes corrective action (appropriate for the season) as required (e.g., fills booster tank), and updates the Engineer's and Company's hose record to ensure readiness of the apparatus.

C. Apparatus Maintenance, Equipment Tests, and Training Exercises

42. Conducts tests (e.g., back-flushing pumps, nozzles, hydrant hook-ups, visual inspection of hard suction hose gaskets and swivels, drafting capability, hose pressure tests) as scheduled to ensure the proper functioning of all equipment.
43. Completes daily engine work as scheduled by thoroughly cleaning and inspecting the apparatus and performing routine maintenance as required in order to keep the apparatus fully prepared.
44. Exchanges apparatus at the repair shop, including hooking up to hydrant and testing functionality before accepting new apparatus, in order to ensure operational readiness.
45. Assists in training company personnel in pump operations and in driving apparatus, as directed by the Company Officer, in order to maintain operational readiness and ensure coordinated efforts by fire fighting personnel during incident operations.
46. Performs other duties as may be ordered by the Company Officer (e.g., apparatus inventories) in order to ensure operational readiness and effective functioning of the fire fighting company.

APPENDIX B

FIRE ENGINEER
IMPORTANT KNOWLEDGE AREAS, SKILLS, ABILITIES, AND OTHER CHARACTERISTICS

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

List of Important Knowledge, Skills, Abilities, and Other Characteristics

Knowledge Areas

1. Knowledge of Departmental requirements for the care and use of hose sufficient to properly clean, bed, inventory, and determine the serviceability of hose on the apparatus in order to ensure usefulness during pumping operations.
2. Knowledge of Chicago Fire Department standard engine operation policies and procedures sufficient to start and operate the apparatus, verify pumping system operational readiness, and determine that equipment is fully prepared for responding to alarms.
3. Knowledge of Departmental policies and procedures necessary to prepare and maintain the apparatus for effective operation appropriate for the season (e.g., cold/sub-zero temperatures).
4. Knowledge of Departmental policies and procedures regarding equipment required to be carried on apparatus sufficient to recognize and conduct an accurate inventory of fittings, nozzles, appliances, AFFF foam, Class A foam, foam educators, foam proportioning systems, engineer safety hitches, wheel chocks, etc.
5. Knowledge of the various types of fire engines currently in use within the Chicago Fire Department sufficient to safely, effectively, and efficiently operate and utilize the apparatus available to the Company during the tour of duty.
6. Knowledge of the self-contained breathing apparatus (i.e., SCBA) sufficient to allow for the proper inspection, maintenance, sanitation, donning, and doffing of the breathing apparatus in order to ensure safe and effective personal use.
7. Knowledge of the Air Purifying Respirator (APR) and respirator canister sufficient to ensure its readiness for use in the event it is required during an incident response.
8. Knowledge of Chicago Fire Department approved publications (e.g., Emergency Response Guide, General Orders, SOPs, Training Bulletins/Academy Notes) sufficient to safely and effectively perform the activities expected of all uniformed members of the Chicago Fire Department during incident operations.
9. Knowledge of the responsibilities and standard operating procedures for Fire Engineers sufficient to effectively contribute to company operations during incident responses and ensure the safety of equipment and personnel.
10. Knowledge of basic tactics necessary to assist the Company Officer during incident operations and during training of company personnel in the performance of Fire Engineer and related duties in order for all members to contribute effectively to coordinated incident control efforts.
11. Knowledge of radio and mobile data computer operation and procedures necessary to effectively transmit, receive, and relay information in accordance with Chicago Fire Department guidelines.

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

List of Important Knowledge, Skills, Abilities, and Other Characteristics

12. Knowledge of policies and procedures governing the driving of fire apparatus and transportation of company personnel necessary to comply with Chicago Fire Department guidelines and State laws.
13. Knowledge of Departmental policies and procedures related to apparatus placement at incident scenes for the safety of on-scene operations.
14. Knowledge of engine pumping operations at a level sufficient to quickly, effectively and efficiently operate the pump and send water at the proper pressure through the appropriate lines during incident operations.
15. Knowledge of nozzle pressures, rates of flow for appliances and nozzles, and field hydraulics necessary to accurately calculate and set the appropriate engine discharge pressure for various hose lead outs, appliances, and nozzles during incident operations.
16. Knowledge of water supply operations (booster tank, water grid system, engines-in-line, drafting, intakes, etc.) to obtain a sufficient source of water for effective engine pumping operations.
17. Knowledge of how to hook up to and determine the designations of Siamese connections for installed fire protection systems in assigned still districts at a level necessary to quickly and effectively supply the system in the event of an emergency response to those locations.
18. Knowledge of the procedures necessary to perform required tests of the apparatus, pumping equipment, and hose and ensure their serviceability.
19. Knowledge of basic apparatus maintenance sufficient to perform preventative maintenance and detect, report, and document problems with the apparatus (e.g., wheels, braking system) as required by the Chicago Fire Department.
20. Knowledge of the specific layout of streets within the assigned still and box district and the general layout of streets within the City of Chicago, necessary to drive the apparatus and transport company personal efficiently and safely to and from incidents.
21. Knowledge of policies and procedures governing the exchange of and acceptance of a new apparatus at the repair shop.
22. Knowledge of duties and responsibilities related to high-rise incident operations, including the use of three-stage pumps.

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

List of Important Knowledge, Skills, Abilities, and Other Characteristics

Skills and Abilities

1. **Analytical Thinking and Problem Solving:** Applying knowledge and experience to select, organize, and logically process relevant information to solve problems; comparing information to determine inconsistencies; identifying and recognizing problems and facts; gathering information in a systematic manner; accurately perceiving relationships among issues and problems; recognizing complexities.
2. **Accuracy and Attention to Detail:** Paying attention to critical activities or instructions and the various details of work (e.g., accurately read and interpret engine gauge readings and hose record book notes); completing work that is thorough and within established standards of accuracy and precision; ensuring accuracy of documentation (e.g., recording information on forms or in Engineer's hose record book); comparing and verifying numbers on equipment (e.g., hoses) against numbers recorded in records.
3. **Mathematical Ability:** Performing basic mathematical calculations (i.e., addition, subtraction, multiplication, and division); calculating appropriate engine discharge pressures for all lead-outs; selecting and using appropriate formulas; understanding relationships between numbers.
4. **Judgment and Decision Making:** Making timely and sound decisions, even under conditions of uncertainty; assessing and managing risks; determining the appropriate courses of action in specific situations; recognizing when assistance is needed.
5. **Learning:** Learning the required knowledge of the job (e.g., procedures, work methods, specific techniques, policies, technical knowledge) through training; keeping up-to-date on technical knowledge and skills related to work; seeking opportunities to learn new things; soliciting advice and feedback from appropriate people; learning from experience and modifying behavior as needed.
6. **Map Reading:** Reading city, street, or area maps in order to identify and navigate to a specific geographical location.
7. **Mechanical Aptitude:** Understanding basic physical and mechanical principles; understanding machinery and equipment operations; recognizing applications for tools; identifying symptoms and locating problems in equipment from various cues.
8. **Memory:** Remembering orientation in buildings; recalling details of techniques, apparatus and equipment, building structures, plans, and incidents; recognizing faces and objects; recalling relevant policies, procedures, and regulations and the situations in which they apply.
9. **Reading Comprehension:** Understanding and interpreting written information (e.g., Department Orders, policies and procedures, training materials, codes and regulations).

10. **Sensory Alertness:** Remaining alert or vigilant and react to infrequent, but important, events, circumstances, or specific details within a stream of information (e.g., alarms, radio transmissions); observing conditions at scenes and being alert for changes in conditions; using various senses to obtain information under conditions of stress and danger.
11. **Spatial Sense:** Sensing direction, distance, and heights; perceiving relative orientation of objects (e.g., uphill, downhill, placement of apparatus, setting ladders).
12. **Verbal Communication:** Communicating orally (both in person and over the radio) at a level necessary to convey information to others (e.g., status and serviceability of engine apparatus and pumping equipment) and to understand information communicated orally from others (e.g., personnel assignments, instructions during incident operations, training); articulating thoughts and ideas to individuals or groups in a manner which is accurate, logically complete, and easy to understand; interpreting what is said in the context of the situation.

Personal Characteristics

13. **Adaptability:** Being flexible in response to different environments, shifting priorities, or ambiguous situations; adjusting plans as incidents occur and conditions evolve; changing direction quickly when necessary; working different assignments as required.
14. **Approachability:** Being accessible and participating in the everyday give-and-take activities of the fire house; fostering the timely flow of quality information between one's self and others.
15. **Cope with Danger:** Coping with the job's physical dangers (e.g., fighting fires; working in low or no visibility conditions; dealing with fire, smoke, falling debris, slippery surfaces).
16. **Dependability:** Following through on assignments without prompting; maintaining a good attendance record; arriving promptly and prepared for work; requiring minimal supervision; conscientious about work performance.
17. **Desire to Help People:** Wanting to be of service to the community; showing concern for others; demonstrating a sincere interest in helping people; willing to work under conditions that can be hazardous, dirty, emotional, exhausting, or otherwise challenging.
18. **Initiative:** Anticipating a need and initiating or taking independent action when appropriate; actively influencing events rather than demonstrating passive acceptance of the outcome; advising others of status and problems.
19. **Interpersonal Relations:** Developing and maintaining a cooperative working relationship with a wide variety of people; relating to individuals in an open, accepting, and sincere manner; building trusting relationships with peers, supervisors, and members of the community; identifying and readily understanding the feelings and motives of others; seeking out and trying to understand differing perspectives and opinions.

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

List of Important Knowledge, Skills, Abilities, and Other Characteristics

20. **Multi-Tasking:** Handling multiple demands at once; dealing with interruptions and crisis situations by responding appropriately, competently, and in a timely manner.
21. **Open-Mindedness:** Treating people fairly regardless of individual differences; remaining impartial and unbiased in the face of rejection or hostility; giving consideration to others' ideas or opinions; maintaining a sense of humor and a realistic perspective; not allowing emotions to drive decisions; accepting of criticism without taking correction personally.
22. **Perseverance:** Staying with a task or assignment, despite obstacles or lack of enthusiasm, until the desired outcome is achieved or is no longer reasonably attainable.
23. **Personal Integrity:** Being consistent with one's principles, values, statements, and behaviors; building trust and credibility with others through demonstrated honesty and commitment to ethical values; accepting responsibility for one's own decisions and actions in the face of challenge or adversity.
24. **Preparedness and Organization:** Setting priorities and planning for routine activities and emergency responses; being familiar with the location and operation of all equipment on the apparatus; coordinating the work activities of one's self and others to make efficient and situationally appropriate use of time and resources.
25. **Professional Orientation and Commitment:** Remaining firm in one's allegiance to the Department's core values and remaining faithful in pursuit of the Department's mission despite obstacles or opposition; setting high standards for personal and others' job performance; following Department policies and regulations and supporting their intent and value; demonstrating positive regard for one's career and the firefighting profession.
26. **Self-Confidence/Awareness:** Demonstrating security in own capabilities and convictions; acting with certainty in difficult or new environments; projecting a positive self-image; willing to voice concerns or handle situations without being easily intimidated; understanding own strengths, weaknesses, limitations, values, motives, and preferences and how these impact own behavior and others.
27. **Stress Tolerance:** Remaining calm and even-tempered when confronted with a dangerous, chaotic, or emotionally charged situation; maintaining level of performance under pressure, opposition, frustration, or crisis.
28. **Team Orientation:** Carrying own fair share of the work load; putting individual ambitions or desires aside for the achievement of group goals; willing to fit into the existing environment; showing respect for the chain of command and others' superior knowledge and experience.
29. **Work Ethic:** Looking for opportunities to pitch in wherever needed; giving full effort to every task assigned; displaying a strong desire to do things well; striving to do better than expected.

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

List of Important Knowledge, Skills, Abilities, and Other Characteristics

Physical Abilities

30. **Strength:** The strength to perform the Fire Engineer Raise (i.e., remove and throw a 24 foot extension ladder by oneself) and to drag lengths of hose from the apparatus and to connect them to the side and rear ports of the engine while wearing full bunker gear.
31. **Manual Dexterity:** The ability to use hands and fingers grasp, hold, turn, and otherwise manipulate objects and controls (e.g., manipulate pump panel controls, operate switches, and tie safety hitches).
32. **Visual Acuity:** The ability to see detail at various distances (e.g., normal reading distance, beyond arm length) and under both normal and adverse conditions (e.g., reading pump panel gauges and dials in low illumination).
33. **Hearing:** The ability to hear and recognize the normal range of sounds in terms of loudness, pitch, tone, patterns or rhythms, or duration.
34. **Driving:** The ability to drive the fire apparatus at a level necessary to safely and effectively transport the engine and company personnel under various weather and traffic conditions and in accordance with Departmental and State guidelines during both emergency and routine operations, including operation of related controls (e.g., lights, siren).
35. **Equipment Operation:** The ability to operate tools and equipment and communication systems required to complete job duties.

APPENDIX C

RECOMMENDED READING LIST FOR

2016 FIRE ENGINEER PROMOTIONAL PROCESS

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

Recommended Reading List

GENERAL ORDERS		
Name	**Title**	**Effective Date**
Department Vehicle Accident Policy	GO 16-008	8/31/2016
Maintenance and Use of Protective Hoods	GO 16-005	8/2/2016
Structural Firefighting Protective Gear	GO 16-004	7/22/2016
Department Uniform and Grooming Regulations	GO 16-001	3/4/2016
Personnel Accountability System Tags	GO 14-006	9/18/2014
Floor Watch	GO 14-003	4/11/2014
Out of Service-Limited Service-Special Duty Procedures	GO 14-002	4/11/2014
Standard Operating Procedures	GO 13-019	9/3/2013
Code of Professional Conduct of the Chicago Fire Department	GO 13-007	4/4/2013
Department Radio Communications	GO 12-008	11/29/2012
Utilization of Seat Safety Belts	GO 07-010	9/17/2007
Portable Radio Security-Loss of Portable Radio	GO 06-011	7/17/2006
Mandatory Use of Self-Contained Breathing Apparatus (SCBA) and Personal Alert Safety System (PASS)	GO 06-006	5/25/2006
Incident Command	GO 04-002	9/21/2004
Incident Command	GO 03-004	10/1/2003
Protective Pouch for the Self-Contained Breathing Apparatus Face Piece	GO 01-004	9/30/2001
Face Pieces for the MSA Self-Contained Breathing Apparatus	GO 01-002	9/30/2001
Standard Engine Operations	GO 93-013	8/18/1993
Care, Maintenance, Use and Bedding Hose	GO 93-012	8/18/1993
Fire Engineer, Bureau of Fire Suppression and Rescue	GO 93-011	8/18/1993
Badge and Cap Device Policy	GO 92-006	3/23/1992
Utilization of Fire Department Form 2 and 2A	GO 91-016	11/8/1991

OPERATIONS ORDERS		
Name	**Title**	**Effective Date**
FS&R Staging Area Communications	OO 16-004	2/11/2016
Cold Weather Sub-Zero Operations	OO 16-001	1/12/2016
Air Purifying Respirator (APR)	OO 15-006	7/14/2015
Orange Nylon Webbing for Engineers Safety Hitches	OO 15-004	6/10/2015
Exhaust Extraction System	OO 14-012	9/18/2014
Use of Phonetic Alphabet in Verbal and Radio Communications	OO 14-010	8/20/2014
Decon Hydrant Caps	OO 12-011	4/3/2012
Three (3) Stage High-Pressure Pumper	OO 06-018	11/27/2006
MABAS Interoperable Water Supply Fittings	OO 06-009	7/21/2006
Fire Response on Limited Access Roadways	OO 02-002	7/17/2002

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

Recommended Reading List

LOGISTICS ORDERS		
Name	**Title**	**Effective Date**
MSA Air Cylinders	LO 16-003	4/20/2016

SAFETY BULLETINS		
Name	**Title**	**Effective Date**
Opening Apparatus Door Into Traffic	SB. 16-003	8/31/2016
SCBA Waist Strap-Belts	SB. 14-001	2/1/2014
DPF Diesel Particulate Filter Aftertreatment System	SB. 09-006	11/1/2009
Safe Driving - Intersection Hazards	SB. 08-006	11/1/2008
Protective Hoods	SB. 07-006	12/1/2007
Fire Hydrant Safety	SB. 07-004	7/24/2007

STANDARD OPERATING PROCEDURES		
Name	**Title**	**Effective Date**
SOP Definitions	See separate SharePoint section	
Mayday Procedures at Working Fires and Fire Training Exercises	S.O.P. 102.00	1/1/2014
Emergency Alert Procedures	S.O.P. 103.00	1/1/2014
Emergency Evacuation	S.O.P. 104.00	1/1/2014
Personnel Accountability Report (PAR) Procedures	S.O.P. 105.00	1/1/2014
Rubbish-Dumpster Fires	S.O.P. 202.00	11/1/2013
Electrical Pole and Pole-Mounted Transformer Fires	S.O.P. 203.00	2/1/2014
Fire Hydrant Operations at an Emergency	S.O.P. 204.00	10/22/2015
Prairie (Brush) Fires	S.O.P. 205.00	11/15/2013
Automobile Fires	S.O.P. 206.00	11/1/2013
Defensive Operations	S.O.P. 207.00	6/25/2015
Residential Garage Fires SOP	S.O.P. 208.00	2/1/2014
Basement Fires	S.O.P. 260.00	11/15/2013
Blitz Attack	S.O.P. 263.00	8/15/2015
In-Line Engine Operations	S.O.P. 290.00	12/1/2015
Active Shooter Incidents	S.O.P. 406.00	2/18/2016
Natural Gas Leak Investigations	S.O.P. 507.08	11/24/2014
Multi-agency Incident Response Procedures - Rev. 1	S.O.P. 601.00	1/7/2016
Backing-Reversing Department Vehicles	S.O.P. 702.00	2/1/2014
Downed Electrical Lines	S.O.P. 703.00	4/1/2014

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

Recommended Reading List

FS&R LESSON PLANS (ITR)		
Name	**Title**	**Effective Date**
Engineer's Raise	LADD-002	

DRILL MANUALS		
Name	**Title**	**Effective Date**
Guzzler	Engine Ops 08-001	
Emergency Threaded Hydrant Ports	Engine Ops 11-002	
Speedswivel	Engine Ops 12-001	
Engineers Safety Hitch	Engine Ops 15-001	6/1/2015
Water Supplied to Auxiliary Apparatus and Equipment	Engine Ops 15-002	12/8/2015
In-Line Engine Operations 16-001	Engine Ops 16-001	3/30/2016
Millennium Mask	Multi-Co Ops 12-002	
Drivers Training	Multi-Co Ops 13-005	
Basement Fires (14-001)	Multi-Co Ops 14-001	

QUICK DRILLS		
Name	**Title**	**Effective Date**
Standpipe Swivel	QD Aug 2001	8/1/2001
Emergency Vehicle Operation	QD Feb 2003	2/1/2003
M 500 Torch Thawing Device	QD Jan 2003	1/1/2003
Proper Cleaning and Disinfecting of the SCBA Unit	QD Jan 2004	1/1/2004
MSA SCBA PASS Alarm	QD Jul 2002	7/1/2002
Pump Ops	QD July 2002	7/1/2002
Interstate Incident Response	QD July 2004	7/1/2004
Arial Pipe Operations	QD Jun 2003	6/1/2003
MSA SCBA Review	QD Mar 2002	3/1/2002
Engine Nozzles	QD May 2001	5/1/2001
Radio Procedures on Fire Ground	QD Nov 2003	11/1/2003
Apparatus Placement and Communication for a Still Alarm	QD Nov 2003	
Hydrant Wrenches	QD Sep 2001	9/1/2001
On a Hydrant	QD Sep 2002	

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

Recommended Reading List

SPECIAL DIRECTIVES		
Name	**Title**	**Effective Date**
Acceptance of Department Apparatus-Vehicles	SD 08-001	1/29/2008
SCBA and RIT Pack Enhancements	SD 06-003	11/7/2006
MSA SCBA Revised Cleaning and Disinfecting	SD 02-002	12/27/2002
Department On-Scene Radio Communications	SD 98-001	5/15/1998

TRAINING BULLETINS		
Name	**Title**	**Effective Date**
TB 1987-07 What You Should Know		
TB 1990-01 Apparatus Placement and Water Supply		
TB 1991 Hard Suction Hookups		
TB 1992-06 Proper Leadout AFFF Foam Application		
TB 1993-09 General Procedures at Hydrants		
TB 1993-09 Hydraulic Formulas		
TB 1993-09 Special Nozzles		
TB 2000-01 High Pressure Hydrants		

MANUALS (MISC.)		
Name	**Title**	**Effective Date**
Air Purifying Respirator Manual		
Defensive Driving Manual 1992 *Specific sections only:* Speed and Right-of-Way Privilege Intersection Accidents	Defensive Driving Manual 1992	1/1/1992
Engineers Manual		
Illinois Rules of the Road		
Illinois Rules of the Road Class_B Non-CDL		
Radio Manual XTS-5000R		
SCBA Manual		
2009 Spartan/Crimson Gladiator Classic Custom Pumper Operation and Maintenance Manual	NOTE: This document is not on SharePoint, but is provided in Appendix E of this Study Guide.	

City of Chicago Fire Department
2016 Fire Engineer Promotional Process

Recommended Reading List

ACADEMY NOTES		
Name	**Title**	**Effective Date**
Burping the Pump	AN Dec 2002	12/1/2002
Alternate Method to Feed a Standpipe System	AN Fall 2004	
Applying Foam	AN Fall 2004	
Operating From High Pressure Hydrants	AN Jan 2000	1/1/2004
In Line Operations	AN Jan 2004	1/1/2004
Back Flushing of Fire Pumps	AN Jun 2000	6/1/2000
Water Hammer in Mains	AN Spring 2004	3/1/2004
Combination Sprinkler and Standpipe System Riser	AN Spring 2008	3/1/2008

ENGINEER REFERENCE GUIDES		
Name	**Title**	**Effective Date**
Allison Transmission - Checking Fluids		12/23/2014
Cummins Regeneration Quick Reference Guide		12/23/2014
Detroit Diesel Regeneration Quick Reference.png		12/23/2014
Field Hydraulics - Quick Reference Guide		12/23/2014
FoamLogix Operating Procedures		12/23/2014

APPENDIX E

OPERATION AND MAINTENANCE MANUAL FOR THE ENGINE USED IN THE PROFICIENCY TEST

2009
SPARTAN/CRIMSON
GLADIATOR CLASSIC
Custom Pumper

OPERATION
and
MAINTENANCE
MANUAL

ACKNOWLEDGMENT

This manual is provided to you, the Engine Company members, by the Chicago Fire Department and covers Operational and Maintenance Procedures which need to be thoroughly understood and practiced, thereby ensuring both SAFE and EFFICIENT operation of your apparatus.

Applicable expertise from the manufacturers, Spartan Motors, Inc., Crimson Fire Apparatus Company, LTD., and Hale Fire Pump Division of Idex Corporation, has been provided herein.

Basic, essential daily preventive maintenance items such as fluid checks of cooling system, crankcase, fuel, power steering, the checking of tire condition, emergency lights and warning devices, while not specifically addressed, are nevertheless normal maintenance procedures.

DEFECTS ARE TO BE REPORTED, WORK ORDERS ARE TO BE OBTAINED FROM THE DEPARTMENT OF FLEET MANAGEMENT.

Where any conflicts or differences may occur from previous apparatus operational guides or procedures, this manual shall prevail on this particular apparatus.

TAKE CARE OF IT, DON'T ABUSE IT, AND IT WILL TAKE CARE OF YOU.

Chicago Fire Department
Division of Training

INTRODUCTION

The 2009 Spartan/Crimson Custom Pumper has been manufactured following nearly two years of effort by representatives of the Chicago Fire Department and the Department of Fleet Management. The goal was to develop a design which best serves the needs of the Fire Department and more importantly, those individuals who operate the apparatus.

Numerous issues were addressed in creating the final design of these pumpers which included overall size, maneuverability, safety and comfort of personnel, compartmentalization, pumping efficiency, hose bed configuration, as well as improved visual and audible warning devices. The Department of Fleet Management specified chassis components, which ensure a more durable and reliable apparatus to cope with the severe duty which our apparatus is subjected to on a daily basis.

Considerable input was provided by field personnel, which included officers, engineers, firefighters, and firefighter/paramedics. While it is virtually impossible to design the perfect apparatus, every attempt was made to include those features desired by the majority of individuals involved in the process.

The new 2009 Spartan/Crimson Custom Pumper incorporates the best features of previous apparatus plus new innovations, which are available from the fire apparatus industry to provide the safest and most efficient pumper design possible. It is the hope of all involved that this apparatus will meet or exceed the needs of all personnel who operate it.

This manual is provided to assist those individuals assigned to drive and operate the 2009 Spartan/Crimson Custom Pumper. It is each Engineers responsibility to read and understand the information and instructions contained within this manual prior to operating the equipment.

CHASSIS

Manufacturer: Spartan Motors, Incorporated

Model: Gladiator Classic

Cab Construction: Aluminum

Components:

- Detroit Series 60 - 12.7 Liter, 350 HP Turbo charged electronic diesel engine.
- Allison, Model HD4060 electronic 5-speed automatic transmission with 4th gear lock-up.
- Switchable transmission retarder.
- Rockwell anti-lock brake system.
- 4-wheel disc brakes
- Self-leveling rear axle air suspension system.
- 6 maintenance-free gel-cell batteries with jumper studs.
- GOODYEAR, Radial-Unisteel TD tires;
- 315 x 80R 22.5 - FRONT
- 11R x 22.5 - REAR
- 63 Gallon fuel tank.
- Racor fuel-water separator.
- Robert Shaw automatic chassis lubrication system.
- Wabco 1200 heated air dryer with moisture ejector.
- Hale FoamLogix 3.3 System
- LifeGuard SRS Side Roll Protection System
- DPF (Diesel Particulate Filter) Aftertreatment System
- Redundant Lighting Circuit Switch
- Emergency Pump Shift

Cab Features:

- Hydraulic/electric cab raise, with manual backup pump
- Scene lights on both sides of cab
- Heated side-view mirrors
- Auto-eject 110 volt shore-line connector with battery condition meter
- Code 3 light bar
- FEDERAL *METEOR* white oscillating light below windshield
- Chicago-style reinforced front bumper with two (2) air horns and FEDERAL Electronic Q2 siren with 200-watt speaker.
- Load Manager lighting system
- Built in electric air compressor and battery conditioner

CAPACITIES

GROSS VEHICLE WEIGHT RATING	44,000 lbs. Front axle capacity - 20000 lbs. Rear axle capacity - 24000 lbs.
FUEL CAPACITY:	63 Gallons
CRANKCASE CAPACITY:	38 U.S. Quarts Crankcase oil type - 15W40, API Classification CF4/SG
COOLANT CAPACITY:	55.5 U.S. Quarts - 50/50 mixture of Ethylene Glycol and water, which meets GM specifications
POWER STEERING:	7 U.S. Quarts - DEXRON III
TRANSMISSION:	39 U.S. Quarts - **TRANSYND**
FIRE PUMP:	Hale 1500 G.P.M. Two-stage Pump Model - Q-TWO 150-23S Pump lubricant: SAE - 90 Gear oil - 3 Quarts
BOOSTER TANK:	500 Gallons
FOAM TANK:	30 Gallons
TIRE PRESSURES:	FRONT - 130 P.S.I. REAR - 120 P.S.I.

APPARATUS DIMENSIONS

TRAVEL HEIGHT:	10 Feet - 0 Inches
BODY WIDTH:	8 Feet - 3 Inches (including rub rails) 9 Feet - 7 Inches (mirror to mirror)
LENGTH:	30 Feet - 6 Inches
TOTAL LENGTH:	31 Feet – 4 Inches (front tow hooks to end of ladder)
WHEELBASE:	168 Inches
REAR OVERHANG:	7 Feet – 11 Inches

PUMPER BODY

Manufacturer: Crimson Fire Apparatus Co., LTD.

Construction: Stainless Steel with Aluminum roll-up compartment doors

Booster Tank: Booster tank is constructed of Polypropylene and is "L" shaped to provide for a lower hose bed height

Features:

- Reinforced hose bed cover with elastic band fastener
- 2 - hose bed dividers, both of which are adjustable
- Lift-off tray for 1¾" hose above 4" hose bed
- Rear compartment for folding attic ladder
- Hinged pump gauge access panel
- Automatic pump cooler
- AKRON - Model 3426 fixed-mount deck gun w/stream shaper and 1-3/8", 1½", 1¾", & 2" stacked tips
- Automatic drain valves on deck gun and cross-lay beds which automatically open when pressure to these discharges drop to 5 PSI or less
- Two upper deck storage areas for foam containers, brooms, shovels, traffic cones, and other miscellaneous items
- AIR BLOWOUT system to assist in expelling water from discharge piping when draining pump in cold weather
- Two spotlights, one at each rear corner of the apparatus. One is equipped with a spot lamp and the other has a flood lamp for scene lighting at rear of apparatus
- Automatic compartment lights in all doors and compartments

FIRE PUMP

Manufacturer: Hale Products Division of Idex Corporation

Model: QTWO 150-23S

Type: Two-stage centrifugal

Rated Capacity: 1500 Gallons per minute

1500 G.P.M. @ 150 PSI - - 1450 Engine RPM (nominal)
1500 G.P.M. @ 165 PSI - - 1500 Engine RPM (nominal)
1050 G.P.M. @ 200 PSI - - 1600 Engine RPM (nominal)
750 G.P.M. @ 250 PSI - - - 1400 Engine RPM (nominal)

Pump Shift: Hale Model VPS, air powered, cab controlled

Transfer Valve: Manual type, gear driven, pump panel-mounted control

Pump Cooler: Automatic thermostatically controlled pump cooler

Engine Cooler: Full-time (non-switchable) Engine Cooler

Discharges:

Four	2½"	(2) Engineer's side, (1) Officers side, (1) right rear
Two	4"	(1) officers side, (1) left rear
One	3"	top mounted deck gun
Two	1½"	cross-lays above pump compartment

Foam Discharges: Two Cross-lay#1
Officers side right rear – Discharge # 4

Suction Inlets:
Two - 6", one on each side of apparatus equipped with manually operated valve
One - 5", with swivel elbow on front bumper and operated with air switch on pump panel
One - 4", located on lower right side of rear of apparatus and operated with air switch on pump panel
One - 3", Tank to pump inlet line

PREVENTIVE MAINTENANCE OF PUMP

Pump Gear Box:

Use SAE 90 Weight Gear Oil. Check oil level on the front of the pump gear case at the plug marked "OIL LEVEL". Oil level should be up to the bottom of the of the plug opening. Level should be checked monthly. While checking gear box oil level, look for evidence of water contamination as indicated by a milky appearance of oil. If contamination is noted, obtain a work order from the Department of Fleet Management.

Auto Lube Bearing:

Check oil level annually. Oil should be up to the top of the reservoir. Use SAE-EP 90 Wt. Gear oil. Oil fill is located on top of Auto lube Bearing on the top front of the pump housing (small hex-key plug).

Pump Primer: Oil-less priming pump, environmentally friendly priming system, which requires NO reservoir. Consequently, there is no siphon-break hole to check.

Transfer Valve: Clean gears and re-lubricate with dry lubricant every six-month. Operate daily.

Valve Linkages: Clean push-pull rods and re-lubricate with dry lubricant every six months. Lubricate valve rod pivot points with a light oil every six months.

Pump Shift: Lubricate the shift cylinder (located behind the pump panel, under the pump) at least once a year by squirting a few drops of light cylinder oil into the shift cylinder.

Tank to Pump: Should be kept in the closed position until needed.

GENERAL PREVENTIVE MAINTENANCE

General daily preventive maintenance checks begin with essential fluid levels for safe and reliable operation of the apparatus. Engine oil dipstick, engine oil fill and windshield solvent can be checked and added in the drop down portion of the front grille. A secondary motor oil dipstick is located on the right side of the motor and is only accessible with the cab raised.

ENGINE OIL:

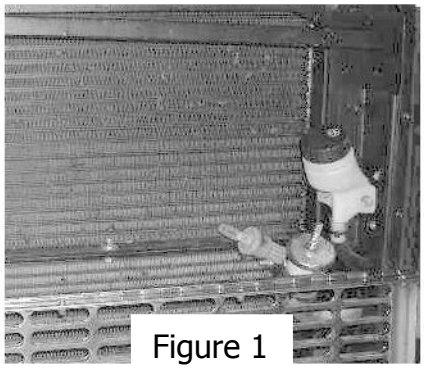


Figure 1

Use multi-grade SAE - 15W-40 motor oil with the proper API classification performance code for diesel engines. The dipstick is located as shown in **Figure 1**. Crankcase capacity is 38 U.S. Quarts. The crankcase oil level should normally be checked after the engine has been OFF for at least 10 minutes to allow proper drainage back to the crankcase.

TRANSMISSION:

Use **TRANSYND** transmission fluid. You must tilt the cab to access the dipstick. Capacity is 39 U.S. Quarts. Because the transmission oil cools, lubricates, and transmits hydraulic power, it is important that the proper oil level be maintained at all times. If the oil level is too low, the converter and clutches will not receive an adequate supply of oil - if the oil level is too high, the oil will aerate, the transmission will overheat, and oil may be expelled through the breather or dipstick tube. **(A transmission diagnostic guide is included at the back of this manual, which outlines procedures for utilizing the shifter keypad to check the transmission status through a series of diagnostic codes.)**

WARNING! WHEN CHECKING THE TRANSMISSION OIL LEVEL, BE SURE THE BRAKES ARE SET AND PROPERLY ENGAGED, AND THE WHEELS CHOCKED.

TRANSMISSION FLUID LEVEL CHECK:

Normal transmission fluid level check can be performed using the diagnostic checks as outlined in the information sheet provided at the back of this manual. However, if the dipstick is used, the following procedure is to be followed:

COLD CHECK:

- The only purpose of the COLD CHECK is to determine if the transmission has enough oil to be safely operated until a HOT CHECK can be made.
- Park the vehicle on a level surface and apply the brake as specified above.
- Run the engine for at least ONE minute. Shift to DRIVE (D) and then to REVERSE (R), then shift to NEUTRAL (N) and allow the engine to idle.
- After wiping the dipstick clean, check the oil level. If the oil level is within the COLD RUN band, the level is satisfactory until the oil is hot enough to perform a HOT RUN check. If the level is not within the COLD RUN band, add or drain as necessary to bring the level to within the COLD RUN band.

HOT CHECK:

- Operate the transmission in DRIVE range until normal TRANSMISSION operating temperature is reached. (140-220°F)
- Park on a level surface, shift to NEUTRAL (N), apply the parking brake, chock wheels and allow the engine to idle.
- After wiping the dipstick clean, check the oil level. Safe operating level is anywhere within the HOT RUN band on the dipstick.
- If the level is not within this band, add or drain as necessary to bring the level to within the HOT RUN band.

POWER STEERING:

Use Dexron III. Power steering fluid can be checked only when cab is raised. Remove the cap from the power steering reservoir and check the dipstick. If necessary, fill until the proper level is obtained.

FRONT AXLE HUBS:

Check for presence and level of 90 Weight gear oil lubricant in each front wheel hub. If lubricant is not visible or is low, obtain a work order. There is a strap across the fill plug, which prevents filling by field personnel.

COOLANT:

The cooling system uses a 50/50 mixture of ethylene glycol antifreeze and water. The system holds about 52 U.S. Quarts. Check coolant bottle as shown in **Figure 1** for proper level. The radiator has a sight glass, which is visible only with the cab fully tilted and the radiator cap is accessible only with the cab tilted. Wait until the engine has cooled if it becomes necessary to remove the radiator cap to add coolant.

CHASSIS LUBE SYSTEM:

The automatic chassis lubrication system pump and reservoir are located in the upper front of the pump compartment, immediately below the cross-lay hose beds. While it is not the responsibility of the engineer to refill the reservoir, the lubricant level should be checked at least ONCE EACH WEEK and a work order obtained when it is less than one-quarter full.

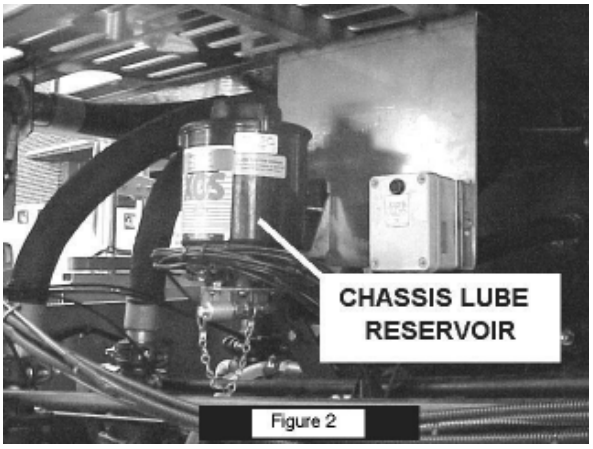


Figure 2

The chassis lube reservoir shown in **Figure 2** can be checked by lowering the hinged gauge panel on the left side of the apparatus, by removing the upper portion of the pump panel on the right side of the apparatus, or when the cab is tilted. The reservoir is transparent to provide for simplified checking of the fluid level

AIR SYSTEM:

An air hose connection is located below the driver's door, above the step. This air hose connection is provided as an AIR INLET **Figure 10** only, to be used in the event the apparatus must be towed and there is inadequate air pressure to release the parking brake.

An AIR OUTLET is located on the pump operator's panel to the left of the large side pump intake. This outlet is equipped with an air hose quick connect fitting and a shut-off valve.

Check for operation of ejector valve on air dryer when compressor tops off air tanks at approximately 120 PSI. Check air tanks periodically for evidence of moisture. Drain air weekly, with shore-line connected to apparatus to test operation of auxiliary air compressor. If the auxiliary air compressor operates frequently when the apparatus is in quarters, a leak should be suspected and a work order may be required to locate and repair the leak.

CAB CONTROLS

UPPER DASHBOARD:

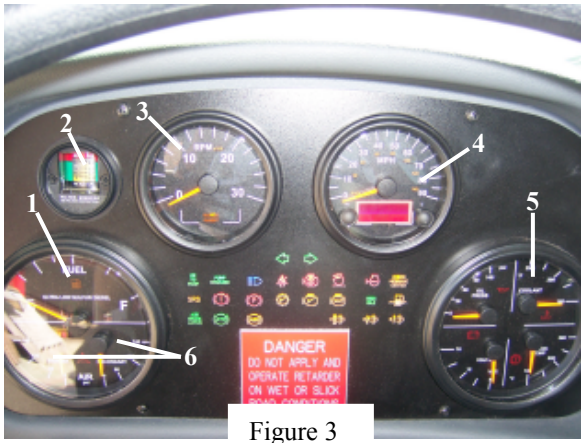


Figure 3

Figure 3 shows the upper portion of the dashboard with the main gauges used to monitor vehicle performance. Below is a list of these gauges.

1. Fuel Level Gauge
2. Filter Minder (Air Filter Restriction)
3. Tachometer with Digital Engine Hour Meter
4. Speedometer with Digital Odometer/Trip Meter
5. 4 in 1 Gauge
   - Coolant Temperature
   - Battery Voltage
   - Oil Pressure
   - Transmission Fluid Temperature
6. Primary and Secondary Air Pressure System Gauges

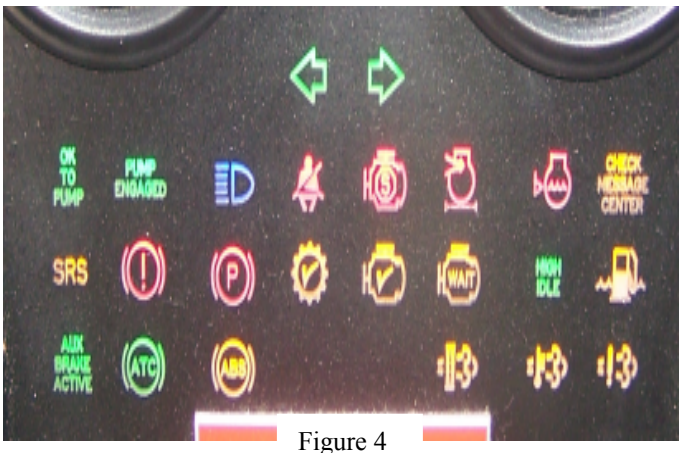


Figure 4

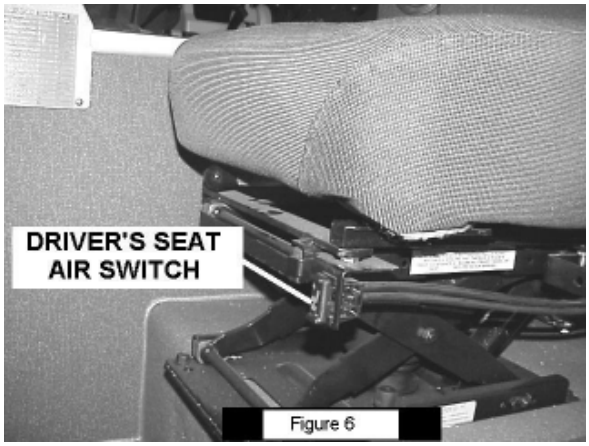
Figure 4 shows the systems warning light cluster located in the lower portion of the upper dashboard. The various lamps will illuminate briefly when the ignition switch is first turned on.

LOWER DASHBOARD:

Figure 5

Figure 5 shows the lower portion of the dashboard assembly. Below is a list of the controls located on the lower portion of the dashboard.

1. Master Battery Switch
2. Ignition Switch
3. Engine Start Button
4. "Road to Pump" Switch with Green "Pump Engaged" Lamps



The driver's seat has several adjustments to meet the preferences of each driver. Shown in **Figure 6** is the air switch used to adjust the support for the driver, which can be adjusted to the driver's weight. The seat can be moved forward or back as required and the backrest can be tilted as desired. There is also a lumbar control for the backrest.

The upper forward section of the motor doghouse serves as a mounting for several controls for the both the engineer and the officer. The items shown in **Figure 7** are listed below.

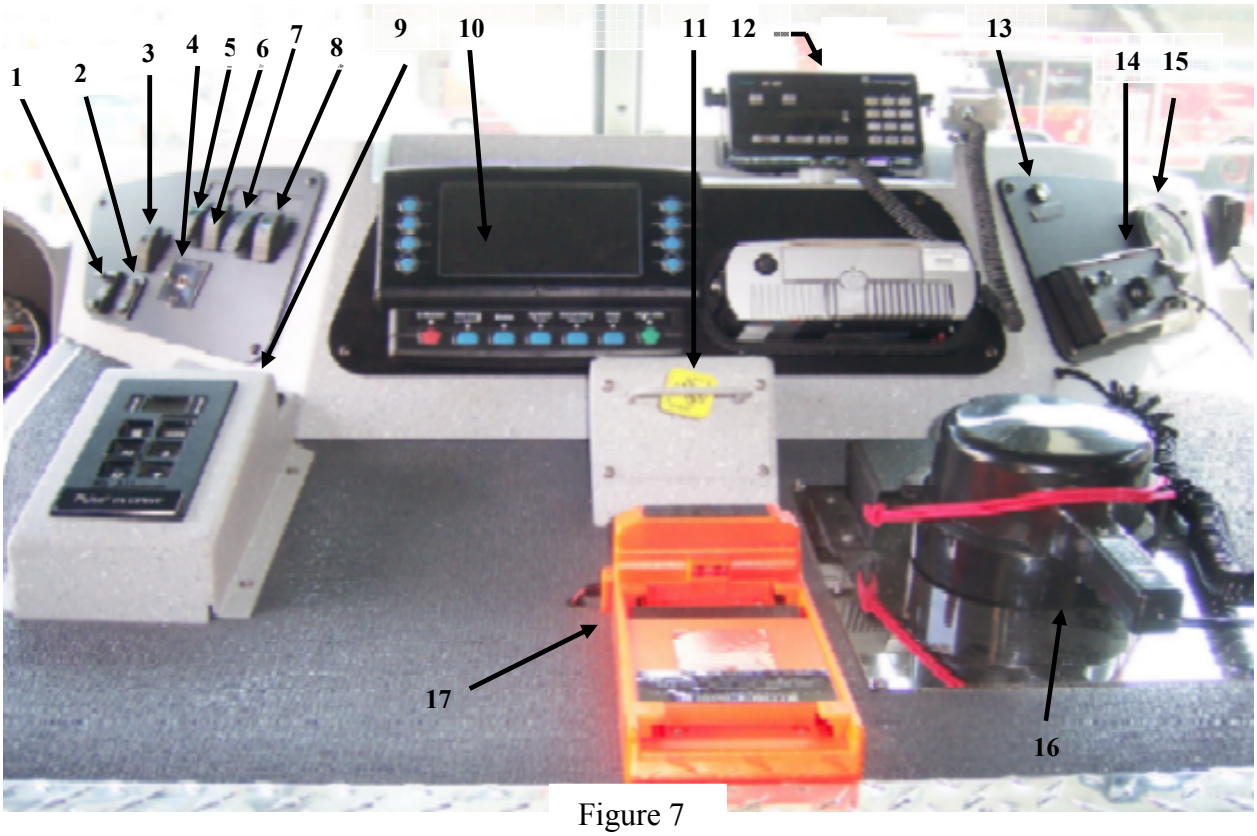


Figure 7

1. Windshield wiper switch
2. Panel light dimmer switch
3. Headlight switch
4. 3-Way Amber LED Warning light switch: Left=sequences left, Center=Random flash, Right=sequences right
5. Retarder switch
6. Heated mirror switch
7. Horn / Siren / Air Horn switch
8. Mud/Snow Traction
9. Transmission Keypad shifter
10. Multi-Plex Vista Screen
11. Parking Brake
12. Radio
13. Retarder "ON" light
14. Siren control
15. Officer's speedometer
16. Spot Light
17. Flashlight

OFFICER'S SIDE DASHBOARD:

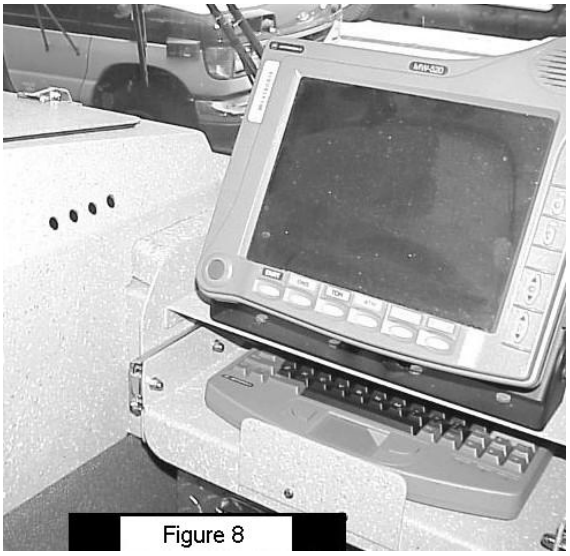


Figure 8

The M.D.C. is mounted directly in front of the Officer's seat where the glove box would normally be located **Figure 8**. A special module was designed for mounting the M.D.C. which includes a slide-out tray for the keyboard.

The siren control module is located on the engine doghouse immediately to the left of the officer's seat **Figure 7**. The Federal EQ2B siren is an electronic siren, which accurately emulates the sound of the electro-mechanical Q2 siren that is by far, the most popular siren in use by the Fire Service throughout the USA. Because the siren is an electronic design with an amplifier and speaker, it also has a PA function with a separate microphone from the radio microphone. The unit can be set to function in the PA mode or a choice of siren mode functions and includes an electronic horn switch. Because the siren takes several seconds to wind-down in the wail or manual functions, a "Brake" switch is provided to silence the speaker in less than two seconds. To operate the siren from the officer's siren foot pedal or the horn button on the steering column, the mode function switch on the siren control head must be set to the "MANUAL" function.

MISCELLANEOUS CAB FEATURES:

Mounted in the ceiling of the cab interior, directly to the rear of the windshield defroster unit, is a warning light to indicate an open cab or compartment door. This is a bright red LED light, which flashes rapidly when a cab or compartment door is still open whenever the parking brake is released.

Just to the rear of the open door warning light is a dome light with two map lights, which are switched independent of the dome light.

Above each cab door is a combination white and red dome light. The red light can be used to provide minimal illumination in the cab without distracting the driver.

A small on-board air compressor is mounted on the cab floor behind the driver's seat. This compressor ensures adequate air pressure when an alarm is received. It should be tested weekly by deliberately draining the apparatus air supply. This can be accomplished by repeatedly pumping the air brake pedal with the motor shut off.

A battery conditioner/charger is mounted on the cab floor under the rearward facing jump seat. The battery conditioner is provided to ensure that the apparatus batteries are maintained with sufficient charge to start the apparatus motor while in quarters, offsetting the constant draining of the batteries by the M.D.C. and G.P.S. systems. AC power to the battery conditioner is provided by the shore-line.

The ALS compartment, located behind the officer's seat, is equipped with AC outlets to provide power for charging ALS equipment. Power for these outlets is provided by the shore-line.

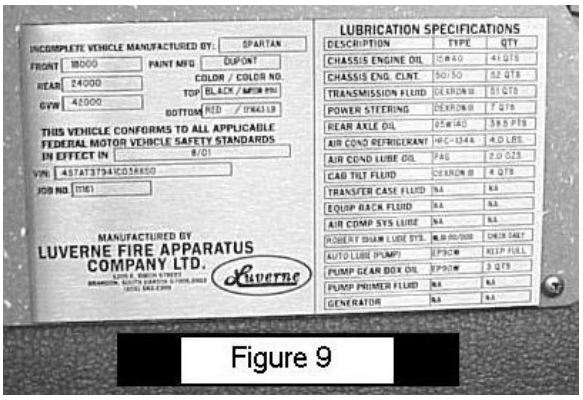


Figure 9

A specification plate is mounted on the engineers' sun visor inside the cab. The specification plate **Figure 9** lists the axle ratings, G.V.W.R., paint codes and Vehicle Identification Number. Also listed are the various fluids for the apparatus and their capacities to serve as a reference for the operator as well as service personnel.

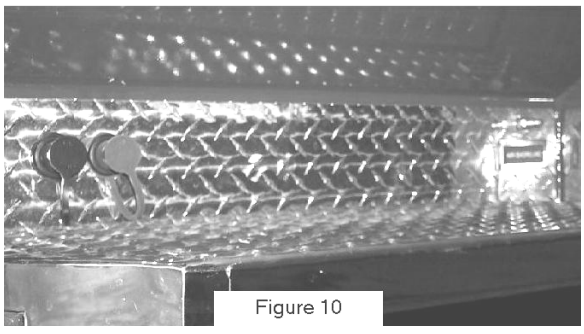


Figure 10

Figure 10 shows the battery jumping terminals located immediately below the driver's door. The terminals are protected with rubberized, color-coded caps (red-positive and black-negative). The jumping terminals can be used if the apparatus must be jump-started or to use the apparatus batteries to jump-start another vehicle. **Also pictured is the previously mentioned Air Inlet.**

A large white scene light is mounted on each side of the cab exterior for illuminating the work area on the sides of the apparatus. Each scene light has its own switch mounted on the switch panel on the engine doghouse.

PUMP AND PUMP CONTROLS

Figure 11

The Hale QTWO-23S pump **Figure 11** installed in this apparatus was designed to meet or exceed the performance requirements specified by the Chicago Fire Department. Working closely with the pump and apparatus manufacturers, Department representatives attempted to develop a design which provides superior flow characteristics for L.D.H. discharges, a deck gun design that provides maximum versatility, and a user-friendly pump panel configuration.

An additional intake is provided on the rear of the apparatus in response to requests from numerous field personnel.

The main goal in configuring the pump operators' panel was to place the operating handle/control and discharge gauge for each discharge as close to the actual discharge port location as possible. This enables the operator to quickly locate the appropriate control and gauge.

The large hand-wheel for controlling the L.D.H. discharges is required due to the size of the valve supplied to control these discharges. A return to the use of the horizontal sliding discharge handles for the side mounted 2-1/2" discharge ports was specified as the design provides ease of regulating the hand-lines most often connected to these discharges.

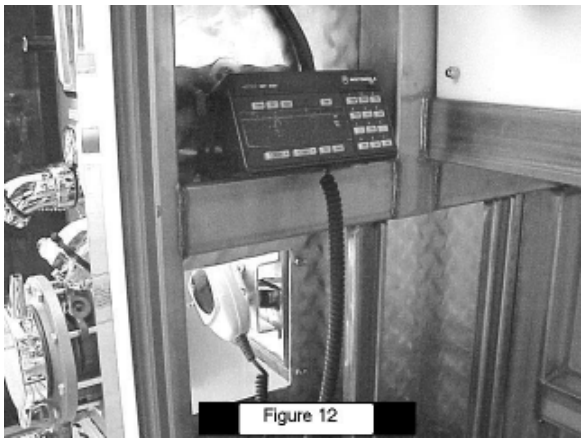


Figure 12

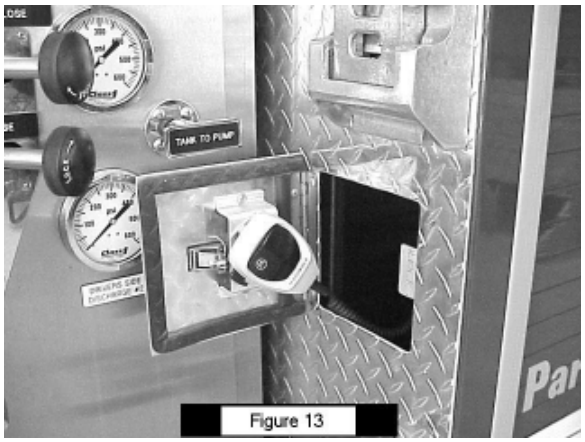


Figure 13

Figures 12 and 13 show the location of the external remote radio control head and microphone. In order to provide a position convenient to the pump operator and yet not vulnerable to the elements, the control head and microphone are mounted inside the "Engineers Compartment". To avoid requiring the door of this compartment to remain open during pumping operations, the microphone is mounted to the inside of a small door, which can be opened to access the microphone when pumping. The control head in the compartment need only be accessed when changing the radio channel or adjusting the volume on the external speaker, which is mounted above the pump operators panel.

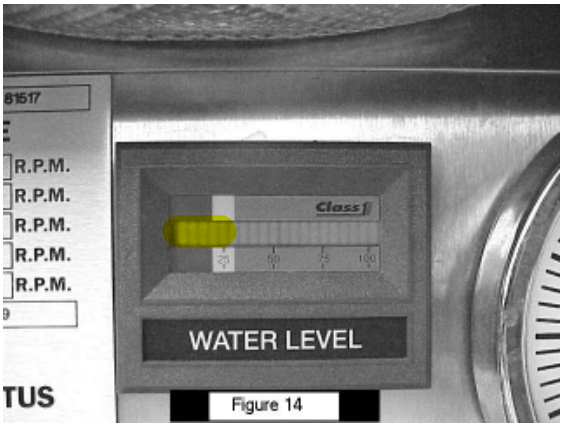


Figure 14

The water level gauge shown in **Figure 14** is located at the top center of the pump operator's panel. The water level is indicated by 20 LED bars with indicators at each quarter of the scale. As the water level decreases, the LED's shut off from right to left. At 25% remaining water in the tank, the LED's, which have shut off, will begin flashing to alert the pump operator that the water level is less than 25%.

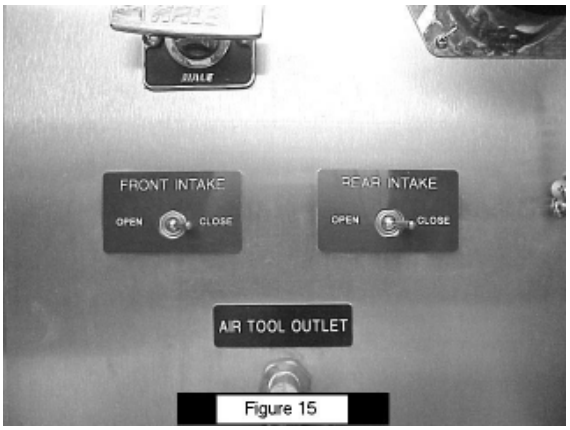


Figure 15

The front and rear suction inlets to the pump have air-operated valves. The front and rear intake switches shown in **Figure 15**, while appearing to be electrical switches, are actually air switches which can be immediately switched from one position to the other. They are designed to open or close the intake valve slowly as required by N.F.P.A. standards.

While the operation of this pump is similar to earlier models, there are some new innovations as well as required accessories that should be discussed. The following is a list of these items.


Figure 16

SUCTION RELIEF VALVE:
N.F.P.A. STANDARD 1901 requires that all new pumpers be equipped with an automatic intake pressure relief system. This system helps protect the intake side of the pump from excessive pressures, as may be encountered when working from a wall hydrant or during an in-line operation. Each of the four suction inlets to the pump are equipped with an intake relief valve as shown in **Figure 16**. With an operating range of 75-250 PSI, the intake relief valves on this apparatus are adjusted to open at 125 PSI.

SELF-BLEEDING DRAINS:
The two cross-lay beds and the deck gun are equipped with self-bleeding drains which open automatically when the pressure on these discharges drops below 5 PSI.

AIR BLOWOUT SYSTEM:

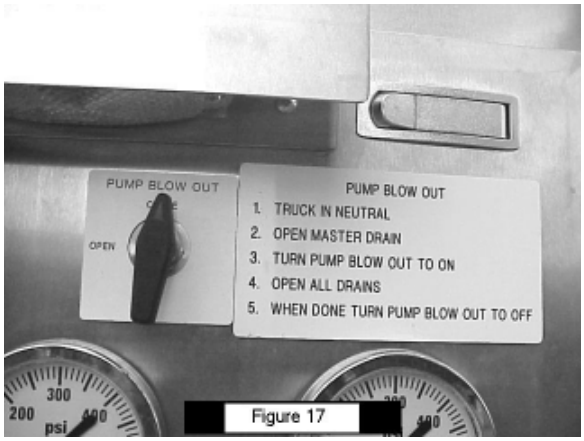


Figure 17

The pump is equipped with an air blowout system, which will help to drain the entire pump of water. This will be especially useful during cold weather. The instruction plate is found at the upper right portion of the pump operator's panel as shown in **Figure 17**.

SLOW CLOSE DEVICES:
N.F.P.A. STANDARD 1901 dictates that all intakes/discharges 3" or larger be equipped with slow open/close devices to reduce the likelihood of water hammer when these valves are operated. Therefore, front and rear intakes are so equipped with the air-operated intake valves mention earlier.

The large side intakes are equipped with manually operated valves, which are opened or closed with a hand wheel.

As mentioned earlier, the L.D.H. discharges have hand wheel operated valves, which prevent rapid opening or closing. The deck gun has a valve, which requires extra effort to open or close to comply with this standard.

BLEEDER VALVES ON INTAKES:
The large side intake valves are quipped with bleeder valves on the outboard side of the valve. The front intake has 2 drain valves, one in front and one behind the front axle, and the rear intake has a bleeder valve handle below the rear intake port.

When receiving water into any of these intakes through 4" hose, such as quick water or in-line operations, these bleeders should be left open until a steady flow of water is present before opening the intake valve. This will prevent air from being forced into the pump, which can cause damage.

ELECTRONIC PRESSURE GOVERNOR:

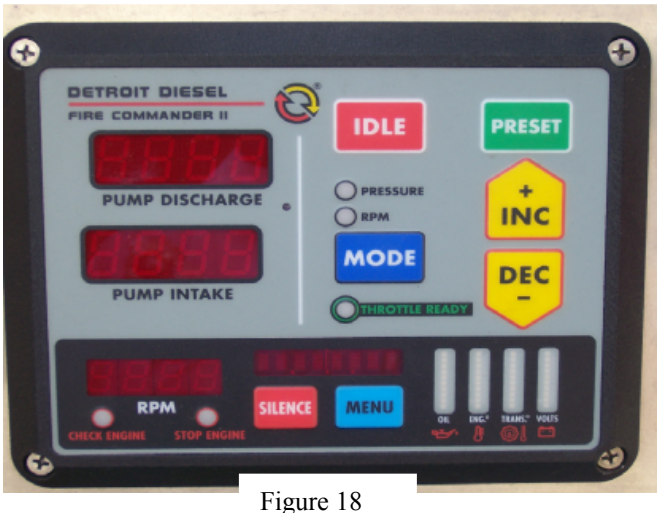


Figure 18

All new engines are being equipped with E electronic pressure governors to control the fire pump. **Figure 18** shows the control panel for the *Fire Commander II,* pressure governor installed on this apparatus. Manufactured by *Class 1,* it is designed to operate pumps powered by *Detroit Diesel* engines.

Earlier apparatus equipped with electronic pressure governors utilized the *Captain* model, which contained the pump controls in one panel and the engine data in a separate panel. The *Fire Commander II,* incorporates both functions into a single unit. The operations of both models are identical with the exception of a few minor differences.

Due to the extensive information required for the safe and efficient operation of the *Electronic Fire Commander II*, a separate manual is being supplied with your new apparatus to assist engineers and certified extra drivers in becoming familiar with this device. It is recommended that a copy of the manual be kept in the apparatus as a reference.

GENERAL OPERATING PROCEDURES

STARTING THE ENGINE:

- $ Turn ON master battery switch.
- $ Turn ON ignition switch.
- $ Engage starter by depressing starter button.

ENGINE SHUT DOWN:

- $ Transmission in NEUTRAL gear.
- $ Engage parking brake or chock wheels.
- $ Turn OFF ignition switch.
- $ Turn OFF master battery switch.

PUMP ENGAGEMENT:

- $ Bring the vehicle to a complete STOP.
- $ Place the road transmission in NEUTRAL.
- $ Engage the parking brake and chock wheels.
- $ Move the Pump Shift control handle from "ROAD", hesitate briefly in the neutral position, then into the "PUMP" position.
- $ The GREEN "PUMP SHIFT" LIGHT immediately adjacent to this control will come "ON" indicating a completed shift.
- $ When ready to immediately discharge water, place the ROAD transmission in DRIVE by depressing the "D" button on the keypad shifter.
- $ The "PUMP ENGAGED-OK TO PUMP" indicator light will come ON in about two seconds, again indicating a completed shift. If the shift does not seem to be completed, repeat the entire procedure.
- $ **Check Speedometer, it should read 15-20M.P.H., if not, repeat procedure.**

NOTE:
The accelerator pedal in the cab is inoperative whenever the pump is engaged.

PUMP OPERATION:
It is imperative that the pump operator thoroughly review and understand the operation of the Electronic Pressure Governor before operating the pump. Refer to the *Class 1* Operational Guide provided with this apparatus before operating the pump.

Before operating the pump, ensure that the GREEN lamp is illuminated next to the pressure governor panel and throttle ready light is illuminated on the pressure govern panel. These lights confirm that the pump is properly engaged and that the pressure governor is ready to control the pump.

You may now proceed with the pumping operation, following established pump operating procedures and information provided in the *Class 1* Operation Guide.

SHUTTING DOWN THE PUMP:

1. Make certain to press the "IDLE" switch on the Pressure Governor Panel to bring the engine to idle speed and cancel the "PRESSURE" mode operation.
2. Shift ROAD transmission to NEUTRAL.
3. Move the pump shift control lever from the PUMP position, pausing briefly in the NEUTRAL position, then into the ROAD position.
4. Neither GREEN indicator lights should be illuminated at this point.

NOTE:
SINCE MODERN PUMPS DEPEND ON WATER BOTH FOR LUBRICATION AND COOLING PURPOSES, IT IS IMPERATIVE THAT A FLOW OF WATER BE PROVIDED TO THE PUMP. IF IT IS NECESSARY TO TEMPORARILY CEASE PUMPING OPERATIONS, MERELY PUT THE ROAD TRANSMISSION IN NEUTRAL.

DRIVING PROCEDURES

ACCELERATOR PEDAL:
The motor on this apparatus has an electronically controlled fuel system. As a result, the accelerator pedal is an electronic device, which results in an instant response to changes in the position of the pedal. On rougher pavements, the bouncing of the apparatus can cause the driver to fluctuate the position of the accelerator pedal making steady application of power more difficult.

To compensate, it has been found that keeping the heel of the right foot resting on the floor of the cab provides a steadier control of the accelerator pedal.

ROAD TRANSMISSION:
The road transmission is controlled by means of a keypad shifter located on the dashboard, immediately to the right of the driver. When the "D" button is depressed, the transmission will shift into DRIVE and the digital display will show the number "4". This indicates that the transmission will operate from 1st thru 4th gear. This range of gears is recommended for operation on city streets.

When driving on an expressway or the Outer Drive, it may be desirable to shift up to 5th gear. By depressing the "MODE" button, the display will change to "5" and the transmission will operate in 1st thru 5th gear. This procedure can be done whether the vehicle is in motion or stationary. The procedure can be reversed as long as the vehicle speed is less than 50 MPH.

When slippery, snowy, or icy road conditions, or steep grades are encountered, it may be desirable to operate in a lower speed range. By depressing the "MODE" button and then the "DOWN ARROW" button, the display can be changed to 3, 2, or 1 to lower the maximum gear in which the transmission will operate.

MUD/SNOW TRACTION:
The apparatus is equipped with a mud/snow traction feature. This allows you to engage the mud/snow toggle switch by pressing it to the on position and continuing to hold it until you are free to move the apparatus. The mud/snow feature allows the axle to slow down rotation which provides more road traction.

TRANSMISSION RETARDER:
The apparatus is equipped with a transmission retarder, which can be switched on and off. The switch to activate the retarder is located near the engineer's right hand. Once the transmission retarder has been switched to the "ON" position, it illuminates the retarder light located on the officer' s side of the dash. **See Figure 7**.

The transmission retarder provides additional braking force to the rear wheels, which considerably extends the service life of the brakes. When switched on, the retarder activates whenever the driver totally releases the accelerator and applies braking action down to approximately 5 MPH.

IT IS THE POLICY OF THE CHICAGO FIRE DEPARTMENT THAT THE RETARDER BE ACTIVATED AT ALL TIMES WITH THE EXCEPTION OF SLIPPERY ROAD CONDITIONS SUCH AS IN RAIN, SNOW, OR ICE.

Due to the fact that the braking force applied by the retarder cannot be regulated by the driver, there is a possibility that it can cause the rear wheels to lock under slippery road conditions, causing a loss of vehicle control. The vehicle's anti-lock brake system is designed to automatically disable the retarder when wheel lock-up is detected, however, the manufacturer strongly recommends that the retarder be disabled by the driver whenever road traction is questionable.

A warning plate has been installed just below the transmission keypad shifter to remind the driver to disable the retarder during slippery road conditions.

CAB TILT PROCEDURES

CAB TILT:

1. Master Battery Switch "ON".
2. Engine not running.
3. Parking Brake Engaged. (Wheels Chocked)
4. Move the front suction swivel to the FORWARD position.
5. (This usually requires stretching out the soft suction)
6. Check the front bumper area for any other items (including hose butts etc.) that may interfere with the raising of the cab.
7. Check and remove/secure any loose items from within the entire cab area. S.C.B.A. harnesses should be removed from all forward facing seats.
8. Make certain that all doors are secured in the closed position.
9. Make certain that the deck gun is resting in the cradle supplied.
10. Front wheels must be pointed forward.
11. Check for adequate (15 FEET MINIMUM) overhead clearance.
12. Remove upper portion of pump panel on officer's side of apparatus to access cab lift controls. **Figure 19**
13. Push and hold electric tilt switch "UP" button until cab tilts and manual safety holding device falls into place. **Figure 20**
14. Push electric tilt switch "DOWN" button until cab rests on the manual safety holding device.

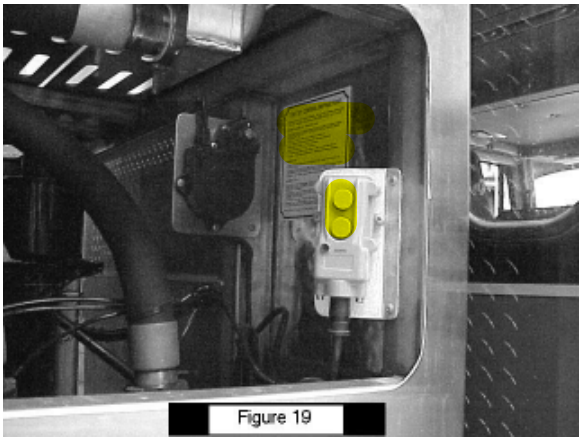


Figure 19

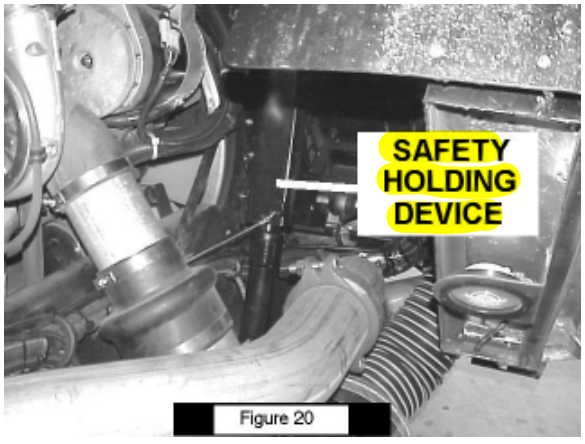


Figure 20

CAB LOWERING:

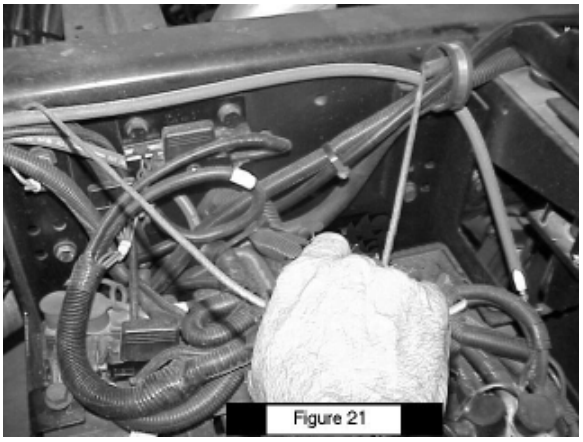


Figure 21

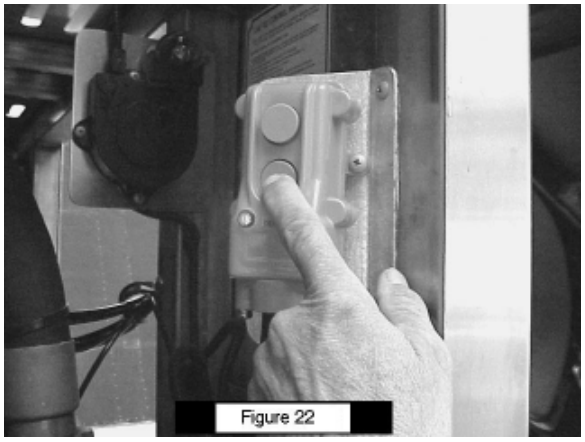


Figure 22

1. Push electric tilt switch "UP" button to free-up manual safety holding device.
2. Pull cable release with right hand **Figure 21**, (CONTINUE TO HOLD ONLY LONG ENOUGH TO DISENGAGE MANUAL SAFETY). At the same time, with the left hand, push the electric tilt switch "DOWN" button to lower the cab **Figure 22**.
3. After the cab appears to be fully lowered, CONTINUE TO HOLD THIS SWITCH DOWN FOR APPROXIMATELY 5 SECONDS or until red lamp flickers or shuts off.

MANUAL CAB RAISING/LOWERING CAPABILITY

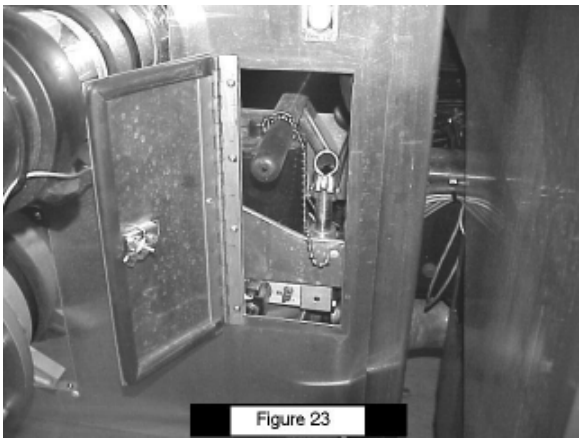


Figure 23

In case of electrical pump failure, the cab may be raised and/or lowered by following the same procedures while providing the necessary hydraulic power via the manual hydraulic jack **Figure 23** provided within a compartment to the right of the L.D.H. discharge port on the officer's side pump panel.

LifeGaurd SRS System:

Figure 24

The apparatus is equipped with the LifeGaurd SRS system. Which provides side roll protection for the driver, officer and rear-facing seat behind the driver. **Figure 24.** The system will be activated in any type of rollover crash.

DPF (Diesel Particulate Filter) Aftertreatment System:

The Diesel Particulate Filter **(DPF)** system is set up to reduce the amount of pollution emitted into the air. This is done by maintaining the soot in the catalytic converter and stores it until the build up reaches a certain amount, which will be burned off during the regeneration process. The Detroit Diesel Electronic Control **(DDEC)** will determine when the regeneration process is necessary. It would be highly unlikely that the system would perform an automatic regeneration due to the fact that we would probably not keep up a high rate of speed for approximately 30 – 40 minutes on any normal run. There is no telling when or how often this may occur, it depends solely on the type of driving the apparatus performs. So that would mean we would probably perform manual regenerations, when it is called for **Figure 25**. While an apparatus is performing a regeneration there should be safety precautions taken, such as assign a firefighter to maintain an area of at least 5-10 feet in all direction of the exhaust pipe due to extreme exhaust temperatures **Figure 26**. If during a manual regeneration your apparatus is called for another run, you will stop the regeneration process by releasing the Maxi-brake and placing the apparatus in the drive position. Place the transmission selector in drive this will automatically stop the regeneration process. This would be considered a partial regeneration and it would require you to start a new manual regeneration when you return to quarters and continue the process until regeneration is completed.

Note: The **DPF** system will not activate while the apparatus is in either the **HIGH IDLE** mode or in **PTO** mode.

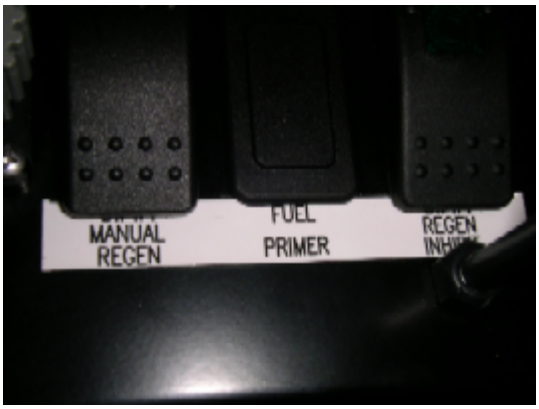


Figure 25

When a manual regeneration is called for, the control switches to perform the manual regeneration can be found under the pump shift PTO box on the lower left side of the steering column.

Solid

Perform a Parked Regeneration **OR** bring vehicle to highway speeds to allow for an Automatic Regeneration

Flashing

Perform a Parked Regeneration **OR** bring vehicle to highway speeds to allow for an Automatic Regeneration

Flashing

\+

PERFORM A PARKED REGENERATION OR BRING VEHICLE TO HIGHWAY SPEEDS TO ALLOW FOR AN AUTOMATIC REGENERATION

\+

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A PARKED REGENERATION MUST BE PERFORMED - ENGINE SHUTDOWN

Figure 26

While performing the regeneration process the vehicle should be placed in an area where there is sufficient space to release exhaust temperatures that are higher than normal. The exhaust will reach very high temperatures and are dangerous for firefighters and civilians.

Redundant Lighting Circuit Switch:

Figure 27

The redundant lighting circuit switch **Figure 27** allows the apparatus to still have emergency lights when all electric power is lost. The switch has a safety rocker, which will automatically turn off when the rocker is in the down position.

Emergency Pump Shift:

Figure 28

The Emergency Pump Shift **Figure 28** enables the apparatus to be placed in the pump position in the event the air operated pump shift operation fails. Follow the instruction posted at the side of the Emergency Pump Shift to engage apparatus in pump.

OTHER MISCELLANEOUS ITEMS

WORK LIGHTS:

The apparatus is equipped with work lights at several locations on the body. The pump panels are illuminated by a switch located on the pump operator's panel.
The rear tailboard area can be illuminated with work lights operated from a switch on the left side of the rear of the apparatus.

Lights have been installed under the catwalk above the ladders to aid in removal and replacement of the ladders. These lights are operated from a switch located on the right rear of the apparatus.

FOLDING STEPS:

The folding steps installed on the body of this apparatus were positioned to provide the best possible access to the upper portions of the body. Using any other portion of the body or its accessories as stepping surfaces is not only dangerous but can cause damage to equipment.

HARD SUCTION HOSE:

Due to the relative infrequent use of the hard suction hoses, they have been positioned in a location on the apparatus, which has reduced the ease of access when needed. This was done to maximize the use of the hose bed area for its intended purpose.

The recommended method of removing the hard suctions from the apparatus is to have personnel climb into the hose bed area, remove the hard suctions from their trays and lay them into the hose bed. After climbing down from the hose bed, the personnel can slide the hard suctions off the back of the apparatus. This method can be used when only the engineer and the hydrant person are available to perform this task.

If additional personnel are available, the hard suctions can be passed off the back of the apparatus immediately upon removal from the tray.

DO NOT ATTEMPT TO PASS THE HARD SUCTION HOSE TO PERSONNEL ON THE GROUND OFF THE SIDE OF THE APPARATUS AS MISHANDLING COULD CAUSE UNNECESSARY DAMAGE TO THE APPARATUS BODY.

REMINDER

ANY DEFECTS FOUND DURING INSPECTIONS OR OPERATIONS MUST BE PROMPTLY REPORTED, AND WORK ORDERS OBTAINED FROM THE DEPARTMENT OF FLEET MANAGEMENT,

WARNING - PER SPARTAN MOTORS, INC.
NO WELDING BY FIELD PERSONNEL ON THIS APPARATUS!
EXTREME DAMAGE WILL RESULT TO THE AUTOMATIC TRANSMISSION ELECTRONIC CONTROLS. DISCONNECTING THE VEHICLE BATTERIES IS NOT SUFFICIENT PREVENTION.

TAKE CARE OF IT, DON'T ABUSE IT, AND IT WILL TAKE CARE OF YOU.