

The Fairness of the Physical Ability Test in the Fire Service

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## CERTIFICATION STATEMENT

I hereby certify that the following statements are true:

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## Abstract

A fire fighter has one of the most physical jobs out there. Therefore, it is important that each fire fighter is physically capable of doing their job at any given moment. The City of Fairfield uses the CPAT (Candidate Physical Ability Test) modeled test to determine if a person is physically able to perform the job upon being hired but does not have a specific test to determine if a fire fighter is physically fit on a yearly basis. The department is currently using a physical ability test that is modeled after the Combat Challenge Course but it has come under scrutiny because recently a female fire fighter and an older male fire fighter have both failed the test. The question is now being asked should there be certain accommodations made based on age and gender. The female employee who failed the test is currently on unpaid leave and the male fire fighter has switched positions within the department.

Descriptive research, an external survey, and literature review were used to answer the following questions: 1) What is CPAT test, 2) How does the CPAT test differ from the test the City of Fairfield is already using? 3) Since the CPAT test is a “Candidate PAT” can it be adapted to be used as an annual test? 4) What should an annual PAT look like? 5) What are the consequences if someone fails the annual PAT?

Surveys were sent out to thirty-one fire departments that have similar make-up of the City of Fairfield, but little response was received. The lack of response skews the validity of the survey. It can be determined that after reviewing the responses from the survey, Fairfield is not behind other departments in the area and in fact may be a head in the area of yearly PAT’s.

The research that was reviewed has shown a need for some type of “annual” physical ability test. The City of Fairfield is currently using an annual test that is modeled after the

Combat Challenge which is a good assessment tool but not a great stand alone assessment. The research has shown a benefit in monitoring a firefighters VO2 Max level. This would be a beneficial piece of information for any department to add to their annual physical ability assessment. The City of Fairfield could improve their annual physical ability assessment by continuing to utilize the modified Combat Challenge course and then implementing the WFI fitness protocols to complete the assessment. Implementing the WFI fitness protocols would not cost the department more money and would improve the health and wellness of their employees.

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## INTRODUCTION

### Statement of the Problem

A firefighter has one of the most physical demanding jobs in America. Therefore, it is very important that every fire fighter no matter race, gender, or age is physically fit and able to answer to the demands of the job. In order to become a fire fighter a person has to be able to pass not only several academic assessments but also physical assessments. While all departments have physical agility/ability assessments for their employee's or potential employee's, not all department assessments are the same or have the same standards. According to Webster's dictionary, a physical ability test is used to evaluate the physical ability of an individual in respect to the physical ability required to perform a particular job.

The City of Fairfield is currently considering adopting the Candidate Physical Ability Test (CPAT) as their physical ability/agility test model. This model originates from the International Association of Fire Fighters (IAFF) and the International Association of Fire Chiefs (IAFC) joint labor management wellness/fitness committee. The CPAT test is used in over 1000 agencies across the United States and Canada as an entry level physical fitness test. Over the past several years the City of Fairfield has given several ability tests that did not follow any certain model. These tests were administered to prospective employees during the hiring process and once a year to all current employees, both full and part-time. During these tests there have been several problems, questions, and concerns that have surfaced. Most recently, 2 current part-time employees and 1 full time employee failed the test. Of the employee's who failed: 2 were female under the age of 40 and the other was a male over the age of 50. According to the departments SOP (Standard Operating Procedure) after failing the test all three employees were

required to meet with the department's physician and undergo a full medical evaluation to determine if they were fit for duty. One of the three employees was determined to be "unfit" and not allowed to return to work until she is able to meet certain medical requirements. The other two employees were found to be "fit for duty" and were allowed to continue to work but were ordered to re-take the physical ability test in six months and must be able to pass at that time.

Due to the failure of the three above mentioned employees several questions and concerns have been brought to light: 1) is there any validity to the ability test that the department is currently using, 2) would switching to the CPAT type test provide validity, 3) should the employee's age and gender be taken into consideration when performing an ability test, and 4) what should happen if an employee fails the test.

*The problem that this research will address is "will adopting the CPAT test provide validity and fairness (gender and age) for the department and what should the consequences be if an employee fails the test"? If the CPAT cannot be adopted as an annual test what should an annual PAT test consist of?*

The research method for this project was descriptive. A survey was administered to all of the members of the Fairfield Fire Department and also to several other departments throughout Ohio. An internet search and literature review was also used to gather information.

### **Purpose of the Study**

*The purpose of this study was to determine if adopting a PAT test will provide the City of Fairfield with a valid and fair assessment of their employee's physical fitness level.*

## **Research Questions**

*The research questions this study will investigate are:*

1. What is the CPAT test?
2. How does the CPAT test differ from the test that the City of Fairfield is currently administering?
3. Since the CPAT is a “Candidate PAT” could it be adapted to be used an annual test?
4. What should an annual PAT look like?
5. What are the consequences if someone fails the PAT?

## **BACKGROUND AND SIGNIFICANCE**

The City of Fairfield is located in Southwest Ohio and is home to approximately 42,000 people (City of Fairfield website, 2011). The make-up of the city is very diverse both socio-economically and ethnically. The city is located less than 20 miles from the City of Cincinnati and houses over 1,200 businesses.

The City of Fairfield Fire Department is made up of 27 full time employees and approximately 60 part time employees. Of the approximately 87 employees 2 are female and approximately 10 are over the age of 50. The fire department consists of three stations that each house a medic unit and a engine company. Each station operates with no less than 4 people per shift. The hierarchy of the department is: Chief, 3 Full Time Shift Supervisor Captain's (1 per shift), 2 Lieutenants (per shift), 3 part-time District Captains (1 per station), 8 full-time fire fighter paramedics (per shift) and approximately 6 part-time fire fighter EMT/Medics (per shift) (see appendix A). Over the past ten years the department has administered several different ability tests to prospective applicants and employees. The full-time employees work 54 hour work weeks, 24 hours on duty and 48 hours off duty.

All employees of the department are currently required to participate in and pass a yearly physical ability test. The Fairfield Fire Department has been administering a pre-hire physical agility test annually since 1984. All employees have been required to participate in an annual Self Contained Breathing Apparatus endurance drill since 1990. This endurance drill was not administered as a pass/fail test but rather an individual self assessment. This drill consisted of: Personal Protective Equipment, carrying hose up 3 flights of stairs, using a Keiser machine, and other physical activities. In January 2011, the department implemented a Modified Combat Challenge ability/agility test, full-time and part-time employees were required to participate in

and complete this test without stopping in between stations. This test is based on the Firefighter Combat Challenge, a national firefighter competition that demonstrates firefighter fitness the professions rigor to the public (Fire Fighter Combat Challenge website, n.d.). The department currently has a training division who is responsible for designing the scenarios that are currently being used for the test. The current physical ability test that is being used was created by taking activities from the Fire Fighter Combat Challenge. In 2011, participants were required to complete the following tasks while wearing a 30 pound weight vest:

- Carry a section of 2 ½ inch hose, over shoulder to the 4<sup>th</sup> floor of the training tower.
- Pull up 20 foot sections of 5 inch hose (4 floors)
- Retreat to bottom of tower touching every step
- Proceed to Keiser Machine- hit 5 foot
- A stationary 35 foot ladder- raise (fully extended) and lower to ground
- Advance a charged 1 ¾ inch hose 50 feet
- Drag a 165 pound rescue dummy 75 feet

During this process you are allowed 15 seconds between each station. (Appendix B) There was no time limit for the completion of this test. If a participant failed to complete the test they were considered to have “failed”. Three employees (2 part time and 1 full-time) failed to complete the test the last time it was administered (May 2012). Two of the employees who failed the test were females between the ages of 30-40 (the only females in the department) and the other was a male over the age of 50 (one of the oldest members). This brought to light several questions: 1) is the test valid? 2) Should the test take in to account a participants age or gender? 3) Are the repercussions of failing the test fair? Currently, the SOP’s state the following: any person who

fails to complete the test is required to get a “fit for duty” letter from their doctor and then have 6 months to re-take the test. If they pass the re-take they are clear for duty. However, if they fail the test they are required to do the following: see the department physician for evaluation and re-take the test within 90 days. If a person was to fail the test for the third time they face the possibility of termination. (Appendix B)

During my research I hope to find a physical ability test that has proven to be valid. I will look at its validity based on age and gender. The information that I gather will be used to propose a change in the test that is currently being administered by our department.

*The potential impact this study could have on the Fairfield Fire Department is to provide the department with a valid assessment tool that could be utilized to measure the employees or potential employee's fitness level as it pertains to the fire service.*

## LITERATURE REVIEW

The purpose of this literature review is to examine existing documentation and literature on the validity of current physical ability and agility tests. Several applied research papers from the Learning Resource Center of the National Fire Academy were reviewed. Journal articles, periodicals, and websites were used to provide information for this research project.

In 2000, the National Fire Protection Agency made a bold but profound statement: “Overweight, out of shape fire fighters are an accident waiting to happen”(Biddle, Ph.D & Bell, M.S, 2011,p.1). An article reviewed stated that a 2005 study revealed almost 50% of all injuries to firefighters in that year were a result of sprains, strains and muscular pain-whereby overexertion is considered the primary causative factor (Biddle, Ph.D & Bell, M.S, 2011, p. 1). Additionally, over 59% of all on-duty firefighter fatalities in the United States in 2011 were caused by stress/or overexertion which resulted in a heart attack (Biddle, Ph.D & Bell, M.S, 2011, p. 1).

A recent article in iNCOMMAND states that America is in the midst of a fight with a health epidemic know as-Obesity (Augsburger, 2012, p. 24). According to a recent report prepared for the National Volunteer Fire Council, an alarmingly high percentage of firefighters are at, or exceed, the general population as being overweight or obese (Augsburger, 2012, p. 24). The study reported that 30-40 percent of our nation’s firefighters are obese and 90 percent of the obese firefighters could not meet minimal standards of fitness as suggested in the NFPA’s 1582 guidelines (Augsburger, 2012, p. 24). This article perfectly articulates the reason the City of Fairfield implemented an ability test for their employees. The department feels that it is very important for their first responders to perform to their fullest potential. Obese and out of shape

Firefighters and Paramedics are costly to a department in several ways. For example: overweight and obese firefighters/paramedics 1) cost fire departments more healthcare dollars, 2) miss more duty days, 3) are at greater risk for injury and disability, and 4) have a decreased ability to perform basic fire tasks (Augsburger, 2012). The same article recognizes that workplace factors may contribute to some of the struggles that firefighters and paramedics face including: poor eating patterns, sleep disruptions, stress and lack of exercise (Augsburger, 2012). The American Heart Association recommends that everyone get at least 150 minutes per week of aerobic activity, incorporate strength training 2 or more days per week and daily stretching (Augsburger, 2012). In order to combat some these issues Fairfield has implemented a mandatory work out time of 1 hour per shift for all employees and conduct yearly physicals for career personnel. While the department has SOP's in place requiring its employees to "work out" it still does not guarantee that all employees are "physically fit" therefore, the need for an ability test.

Most physical fitness programs or workouts do not meet the needs of firefighters. Firefighters need a fitness program designed to mimic the movements of the job while taking into account the stress they endure in a first responder situation (Provencher & Carson, 2011).

The physical demands of firefighting, as an occupation, are characterized by significant activation of the cardiovascular, metabolic, and endocrine systems. Heart rates in excess of 95% of maximum, rates of oxygen consumption approaching maximal oxygen uptake ( $VO_2$  max), and significant activation of the sympathoadrenal axis have been recorded during simulated or live firefighting tasks. Thus, fire fighting suppression activities may be a significant physiological stress and high levels of fitness are required by the firefighter. Although the generalized physiological reactions to fighting fires have

been investigated, the physical attributes and fitness components required for optimal firefighting performance have not been fully identified. For this reason, it has been difficult to design appropriate remedial intervention programs that make optimal improvements in the qualities most important for firefighting performance. Previous studies on firefighters have assessed factors most closely aligned with steady state work/exercise, i.e., aerobic metabolism, while little is known about the role of anaerobic energy sources during firefighting tasks (Sheaff, 2009, p. 1)

The research into VO<sub>2</sub> Max is also important to look at when discussing physical fitness when it comes to firefighters. VO<sub>2</sub> Max is the measure of the maximum rate at which a person's body is able to consume oxygen when performing a specific activity, adjusted for body weight ("Firefighter Fitness", 2012, para. 1). This is important in the fire service because the higher a person's VO<sub>2</sub> Max level is the less oxygen they need to perform a service. Because of the high physical demands of firefighting, abrupt changes from rest to high intensities, a number of environmental and psychological stressors and the use of protective garments contribute to the increased mortality from cardiovascular disease among firefighters (Mier & Gibson, 2004, p. 373). In order to address these issues, the WFI (The Fire Service Joint Labor Management Wellness/Fitness Initiative) was developed. The WFI recommends a VO<sub>2</sub> Max uptake of at least 42 ml/kg/min in order to meet the aerobic demands of the job adequately (Mier & Gibson, 2004, p. 373). The IAFF has protocols in place that describe how the VO<sub>2</sub> Max level should be calculated (Appendix C). According to the IAFF, there are many assessments available to evaluate aerobic capacity. However, the WFI (Wellness/Fitness Initiative) recommends either the WFI Treadmill Protocol or the WFI Stepmill Protocol ("WFI Fitness", n.d., p. 1). A maximal

aerobic capacity test can also be used determine V02 Max value but this should be done under medical supervision. The Wellness/Fitness Initiative evaluates 5 components of fitness to determine a baseline level of fitness for fire service personnel and to measure progress from year to year ("WFI Fitness", n.d.). The five components are Body Composition, Aerobic Capacity, Muscular Strength, Muscular Endurance, and Flexibility ("WFI Fitness", n.d., p. 1).

As mentioned previously, the Fairfield Fire Department has been administering ability tests for the past couple of years but the validity and fairness of the tests have been questioned. The test that the department is currently using was developed by the Training Division and does not take into consideration a person's gender or age. Recently, two employees have failed the test, one female and one a male who was over 50. Because of these two failures, the validity of the current test has come into question and the department has decided to research other ability and fitness tests. The test the department is currently using is modeled after the Combat Challenge. The current ability test contains work related tasks and is not timed when being administered as an annual ability test. The training department chose this test because it had specific work related tasks, it was free, and was easy to administer. The Combat Challenge was originally the only federally funded, university based occupational health physiological research study that has become an internationally touring and sports event ("Firefighter's Combat Challenge", n.d., para. 1). In 1975, The University of Maryland received a federal grant in the amount of \$87K from the precursor to the US Fire Administration ("Firefighter's Combat Challenge", n.d., para. 3). The original research was not intended as a sports competition, a large part of the research was based upon five sequentially performed fire ground evolutions with input from the Greater Washington Council of Government Fire Training Officers sub-committee ("Firefighter's Combat Challenge", n.d., para. 5). While the Combat Challenge is

based on firefighter tasks is it the best format for an annual ability test? There is a lot of research and documentation about entry level ability test, but not as much research about an annual test.

The most popular entry level test appears to be the **Candidate Physical Abilities Test (CPAT)**.

That still leaves the question: what is the best annual test?

The CPAT test was created by the International Association of Fire Fighters (IAFF) and International Association of Fire Chiefs (IAFC) Joint Labor Management Wellness/Fitness Task Force in 1997 (IAFF Firefighters, n.d.). This taskforce was given the job to address the need for non-punitive approach to wellness and fitness in the fire service. The Task Force then discovered that municipalities were hiring people who would not be physically capable of a successful career in the fire service (IAFF Firefighters, n.d., p. 1). These findings resulted in the development of a valid tool used to hire firefighters- the CPAT. In order to develop the CPAT test the task force looked at wide variety of factors. They developed a list of 31 tasks (skills that all fire fighters should possess) and then developed questions related to these tasks. They validated these tasks by randomly surveying 1000 firefighters throughout the 10 departments that the task force was made up of (this was an anonymous survey but consistent with the gender and race diversity of each department (IAFF Firefighters, n.d.). The completed results of the surveys resulted in the development a series of physical ability tests that were selected based on the results of the data indicating the physicality and criticality of the tasks performed by fire fighters (IAFF Firefighters, n.d., p. 1). The research mentioned above resulted in the creation an eight station assessment that was designed to be completed consecutively without stopping. The overall consensus found the test to be a good predictor of an applicant's ability to perform basic fire fighting tasks. The Technical Committee was confident that the ability test would provide

the fire service with a physically competent recruit. There was also unanimous agreement that the test equaled or was superior to current test run by each of the ten jurisdictions (IAFF Firefighters, n.d., p. 1). The CPAT consists of the following stations, all to be completed while the candidate is wearing a 50lb weighted vest that simulates the weight of a fire fighters gear: (IAFF Firefighters, n.d., p. 1)

- Stair Climb (climbing stairs while carrying an additional 25 lb. simulated hose pack),
- Ladder Raise and Extension (placing a ground ladder at the fire scene and extending the ladder to the roof or a window),
- Hose Drag (stretching uncharged hose lines, advancing lines),
- Equipment Carry (removing and carrying equipment from fire apparatus to fireground),
- Forcible Entry (penetrating a locked door, breaching a wall) and
- Search (crawling through dark unpredictable areas to search for victims).
- Rescue Drag (removing victim or partner from a fire building),
- Ceiling Pull (locating fire and checking for fire extension)

The CPAT is not designed as a “stand alone” test. According to the IAFF and IAFC the test is to be used along with 2 mandatory orientation sessions, a practice guide, and hands on training with the equipment. The test takers are also required to have 2 practice sessions within 30 days prior to taking the actual test (these sessions are not to be timed). The task force requires that every department that is licensed to use the CPAT test follow the above guidelines or ensure that the licensed test facilitator follows the guidelines.

In order for a department to use the CPAT test they must comply with the Uniform Guidelines on Employee Selection Procedures (1978). Any fire department that is utilizing the CPAT test must validate that the CPAT is a suitable test for their jurisdiction (IAFF [IAFF], n.d., Chapter 3). The specific section in the Code of Federal Regulations (CFR) that applies to validating a test for one organization that was developed by another organization is found in CFR 1607.7. This section of the Guidelines requires the organization provide evidence in three specific areas (IAFF, n.d., Chapter 3). First, the employer must provide evidence of the validity. Second, they must be able to provide evidence of job similarity with the job on which the validity study was performed. Third, the proof of test fairness.

Another every important part of the selection criteria is transportability studies. The goal of transportability studies are to demonstrate that the major work behaviors required of the participants in the initial test development are sufficiently similar to the major work behaviors required by other users of the selection criteria (IAFF, n.d., p. 3). The steps to conduct an effective transportability study include (IAFF, n.d., Chapter 3):

- Selection of transportability study leader
- Analysis of job duties required by the department
- Completion and analysis of the physicality and criticality surveys
- Completion and analysis of equipment survey
- From the analysis, creation of a written job description
- Apply of licensure from IAFF

A **transportability leader** should be someone who is familiar with CPAT protocols, has good communication and administrative skills. This person is the main person in charge of implementing the CPAT for the department and ensuring the security of the data that is gathered (IAFF, n.d.).

Performing the **job analysis** is the basis for the transportability study. Several steps have to happen to accurately perform a job analysis: determining the number of required survey participants, selecting the survey participants, determining where and how the survey will be implemented, administering the surveys, and having the data evaluated by a professional either within the department or outside (IAFF, n.d., Chapter 3).

The **completion and analysis of the physicality and criticality of the surveys** is a very important step in this process. Surveying an accurate number of fire fighters in your department is crucial. Representing the diversity in the department is also essential. In order for this to happen the following steps must be followed: The number of people surveyed is dependent of the size of the department. The larger the sample size, the stronger results. Small departments may have to survey all of their employees, while larger departments may only need to survey a percentage of their employees (IAFF, n.d.). Participants should be selected by stratified sampling. The distribution of the surveys will vary from department to department based on size. For example, a small department may give the survey in a large group to ensure consistency (IAFF, n.d.).

The next step in the process is the **equipment survey and analysis**. During the development of the CPAT the technical committee developed an equipment survey to

identify the type, size, and weight of tools, equipment, and personal protective clothing used by each fire department (IAFF, n.d., Chapter 3). From this survey data, the technical committee developed the standard weights and types of tools and equipment, established the distances used in the course layout, and determined the lengths used in prop and test equipment design (IAFF, n.d., Chapter 3).

After the equipment survey is complete, the job analysis survey data must be analyzed to determine if the department is similar to the original 10 fire departments (see appendix). It is important that the data is accurately analyzed. According to the article, a testing expert should perform the final data analysis to ensure the data comparisons are within your limits to allow your fire department to use the CPAT (IAFF, n.d., Chapter 3).

The final step is **licensure**. To ensure the proper use of the CPAT employers using CPAT must apply for a license. Currently, authorization to use the CPAT will only be given to departments that will be fully administering the CPAT program (IAFF, n.d.). By limiting the granting of licenses the IAFF have been able to better ensure the CPAT is being administered in strict compliance with the licensing agreement (IAFF, n.d.).

The CPAT is designed as a candidate PAT which is poses the question can it be adapted to an annual test? If it was to be used annually what changes would need to be made in order for it to provide an accurate assessment. What should an annual PAT look like?

The National Fire Protection Association (NFPA) 1500, Standard on Fire Department Occupational Safety and Health Administration (OSHA) Program, among other things,

emphasizes the wellbeing of the fire fighter, especially his or her health and physical fitness (Romines , 1998, p. 8).

A national research survey shows that of 185 chief-level officers revealed that only 25% of fire departments use physical ability tests as annual maintenance standards for ensuring the fitness levels of their incumbent fire suppression personnel (Biddle, Ph.D & Bell, M.S, 2011, p. 1). The same survey showed that 93% of the fire chiefs believed that “fire suppression personnel” should be tested annually to ensure they possess the minimum physical abilities necessary to perform the job (Biddle, Ph.D & Bell, M.S, 2011). It is a fact that fire fighters age once they start working and aging has a direct impact on fitness levels (Biddle, Ph.D & Bell, M.S, 2011). For example, one study of 256 fire fighters (average age of 34.58) revealed a high correlation between age and test scores. This correlation translated to 5 seconds slower per year. To put this into perspective, a 25 year-old firefighter has a predicted score on the work sample PAT of about eight minutes, whereas a 50 year-old firefighter has a predicted score of ten minutes (Biddle, Ph.D & Bell, M.S, 2011, p. 2). This two-minute score difference is attributable to age alone. This trend clearly indicates that age, if left to its natural process without fitness training interventions, will gradually move a minimally-qualified firefighter who (at age 25) barely passed the job-related minimum cutoff score (9 minutes and 34 seconds on this particular PAT), to a score that is one full minute slower in just 12 years (Biddle, Ph.D & Bell, M.S, 2011, p. 2). According to Biddle, (Biddle, Ph.D & Bell, M.S, 2011, p. 3), “Departments that adopt work sample PATs as an annual maintenance standard must address three controversial issues: (1) selecting an appropriate cutoff time for the test (the same time used for entry level or slower/faster), (2) choosing which positions will be selected for the annual testing requirement,

and (3) identifying the steps that will be taken with incumbents who cannot pass the annual test, even after repeated retest opportunities”.

In order to determine an appropriate cutoff time for the test a department needs to review the data used for the new hires and then run a “representative sample” and use the “observed scores to determine a “maintenance standard” cutoff (Biddle, Ph.D & Bell, M.S, 2011). When it comes to who should be selected for the annual test, Biddle's research suggested that Firefighter, Fire Engineer, Fire Captain, and Fire Lieutenant were overwhelmingly named as the group who should be tested (Biddle, Ph.D & Bell, M.S, 2011). The article does agree that who is tested should be a departmental decision.

The next question the author addresses is “What should happen if an employee fails the PAT”. According to Biddle's research (Biddle, Ph.D & Bell, M.S, 2011, p. 7) most responding chiefs (90%) agreed that requiring a condition program was a sound “natural consequence” for incumbents who cannot pass maintenance PAT. However, a significant portion of the chiefs stated that more severe consequences (taking a leave of absence or retirement with pension) would also be justified (with 27% and 22% endorsement, respectively). Only 15% endorsed the most extreme consequence (required disability leave). The author goes on to say that before going to the most restrictive consequences the department should first allow an employee to retest (2 times) with a 10-16 week training program in between retest (Biddle, Ph.D & Bell, M.S, 2011). The same article also goes on to say that an incentive could be offered for people who pass the PAT.

## PROCEDURES

Descriptive research was utilized in order to gather information and to answer questions regarding this applied research project. An anonymous survey was sent to other departments of similar size and make-up of the Fairfield Fire Department in order to gather information about their physical ability testing and requirements.

A literature review was conducted to research the topic of physical ability/agility test. Previous research papers, professional journals, fire service books and the internet were all used to gather information.

A 10 question survey (Appendix B) was sent to 31 fire departments in Ohio in order to gather information on their current PAT requirements. The survey was sent via Survey Monkey to all current OFE class participants, Chiefs, and Training Coordinators in other Ohio Departments. A total of 19 departments responded to the survey (Appendix C results). There were limitations to the survey, 31 departments were surveyed but only 19 departments responded

(61% return rate). The survey was only sent to departments in Ohio which also limits the results and the validity of the survey.

### **Definition of Terms**

IAFF	International Association of Fire Fighters
IAFC	International Association of Fire Chiefs
CPAT	Candidate Physical Ability Test
PAT	Physical Ability Test
SOP	Standard Operating Procedure
SCBA	Self Contained Breathing Apparatus worn by firefighters
NFPA	National Fire Protection Agency
VO2 Max	Measure of maximum rate at which a body can consume oxygen when performing a specific activity

### Results

The results of the survey are limited due to only 19 departments responded and every question was not answered by each department (Appendix D). The overall results indicated that only 31.6% of the departments utilize some sort of yearly physical ability testing (see chart below). The survey was sent to departments who were made up of Career (full time), part-time and combination personnel. None of the departments surveyed had volunteer personnel. The majority of the departments who responded were made up of Career personnel or 75%.

The survey directed respondents who answered “yes” to the question:” Does your department require a yearly physical ability/agility test” to continue on to the next question. That question was: “Does your department take into consideration a person’s age or gender?” 8 of the 19 departments answered this question and 75% of those said their department does not take into consideration a person’s age or gender. The results further indicate that, 57.1% of the departments reported that their physical ability testing was based on “fire ground tests”. Again, there was a limitation to this question because only 8 of the 19 departments who responded answered this question.

Another question asked was about the ability/agility test being a timed test. Only 50% of the departments indicated that their test was “timed”. In order to see what happens if a person fails the test, respondents were asked to list consequences if a person fails the test. 8 people responded to this question and 50% said “yes” there were consequences if a person failed the test. The consequences included: “employee is placed on mandatory fitness program but can continue to work”, “employee must follow up with PCP and retest”, and “an exercise specialist will prescribe a performance improvement plan specifically designed for the individual”. The next question asked was to see if there were rewards for employees who passed the agility ability test. Again, only 8 departments responded to this question and of the 8 departments, 6 of them said there were NOT rewards for passing (75%).

The last question in the survey asked respondents if their department required an annual health physical. This question had 16 responses and indicated that 56.3% of the departments required annual health physicals.

### **Discussion**

Research has shown that a firefighter's health and physical fitness is very important and directly affects their job performance. A firefighter arrives on scene wearing at least 50 pounds of equipment. The firefighter is then required to rush into action which elevates the heart rate, stress levels, and adrenaline. Therefore, it is imperative that each member of the department is physically fit and able to perform all tasks related to their job. Research by Biddle ((Biddle, Ph.D & Bell, M.S, 2011) shows that firefighters age when they start working. To put this into perspective, a 25 year-old firefighter has a predicted score on the work sample PAT of about eight minutes, whereas a 50 year-old firefighter has a predicted score of ten minutes. This two-minute score difference is attributable to age alone (Biddle, Ph.D & Bell, M.S, 2011). Most departments have physical fitness requirements for their employees. A survey was conducted of 31 departments in Ohio in order to gather data on physical fitness requirements and incentives in other departments. It was determined by examining the data and through research, most departments have some type of physical fitness requirements for their career employees.

However, it was also determined through research that there is not a preferred physical ability test.

The question that this research project looked at is what is the best/most valid way to measure a person's physical fitness level; regardless of race, age or gender, on an annual basis. Descriptive research was used to investigate this topic. The initiative for this project was, recently the Fairfield Fire Department had two members fail the current ability test and the question was brought up: is the current test fair? One of the employees who failed the test was a female (there are only currently 2 females on the department) and the other was a male over the age of 55.

The department is currently using a physical ability test that is modeled after the Combat Challenge for an annual physical ability assessment and a pre-hire physical ability assessment. The only difference being that the pre-hire candidates are required to perform the tasks in 7 minutes or less and career employees have no time limits. The results of the survey conducted showed that only 50% of the departments that responded are currently giving **timed** ability tests to their career employees. The department's training division chose this model for an annual test because it requires firefighters to perform actual job related tasks. The current test does not offer any accommodations for age or gender which has caused a lot of discussion recently. The results of the survey that was administered during this project show that 75% of the departments who responded also said that their departments ability test **does not** take in to account a person's age or gender. This was an unexpected result. Through research, it was discovered that a popular research topic has been age and gender discrimination of physical ability tests in the fire service. Several research papers were reviewed on this topic. According to one research paper from Oakland, results and research showed that women do have a higher rate of failure on the CPAT

test but the test was validated and proven to have no adverse impact (Baker, n.d., p. 40). The same paper goes on to state that women actually have a higher passing rate on the CPAT than they did on the previous test administered by the Oakland Fire Department (Baker, n.d., p. 40).

Another question that was asked during the research for this paper was “Does your department offer incentives for passing the ability test?”. The Fairfield Fire Department is not currently offering any incentives for firefighters who pass the ability test. Through the survey and through research it was determined that several departments do use some type of incentives for motivation to help their employees stay fit. The Fairfield Fire Department currently requires all firefighters to work out one hour per 24 hour shift (Appendix E). This requirement was implemented to help with the physical fitness of the firefighters.

Along with the ability test, career employees are required to undergo a yearly physical exam that is performed by the department’s medical expert. According to the survey that was administered, only 56% of the departments surveyed require their career employees to pass annual physicals. The Fairfield Fire Department has SOP’s in place that define the process should a person fail the annual ability test or the physical exam. The female who failed the physical ability test is currently arguing that the physical ability test is not fair based on gender. In her case, the SOP’s were followed, however, she failed the test on more than one occasion and is not currently working for the department due to being “unfit for duty”.

One of the questions that this research project tried to answer was: could the CPAT be adapted to become an annual Physical Ability Test? The CPAT was created by the IAFF and IAFC as a test that would test job functions performed by firefighters. The CPAT is a standardized physical ability test that is used in over 1000 departments across the United States. It is given to “candidates” before they are hired. It has also been validated to be fair with no

adverse impact on any group. There are very clear and closely monitored requirements for the CPAT which helps with the validity aspect of the test. Due to the strict transportability requirements, the CPAT is not easy to administer and would be very difficult to use as an annual ability test. There are several steps that are required to implement the CPAT and doing this on an annual basis, for the number of firefighters that would be involved, would be a costly and a time consuming job. Adapting the CPAT to make it an annual test does not appear to be the best way to monitor a firefighter's annual physical fitness level.

The National Fire Protection Association (NFPA) has long been aware of the need for physical fitness programs for firefighters and since 2000, has published NFPA Standard 1583, *Standard for Health-Related Fitness Programs for Fire Department Members* (Squegila, 2012, para. 1). The NFPA Standard 1583 could provide the department with a relatively affordable way to implement a physical ability test that has strong validity. It contains five components across the health and fitness spectrum which must be adhered to for a department to claim compliance. This assessment includes an aerobic capacity test that includes measurement of VO<sub>2</sub> Max. The IAFF and IAFC have developed protocols to help with annual physical ability requirements. They have written protocols that suggest how to determine and monitor the VO<sub>2</sub> Max (the measure of the maximum rate at which a body can consume oxygen when performing a specific task). The Wellness/Fitness Initiative evaluates 5 components of fitness to determine a baseline level of fitness for fire service personnel and to measure progress from year to year. Following the WFI protocols for fitness (Appendix C) appears to be a much easier and more cost effective way to monitor annual physical fitness. Monitoring a firefighters VO<sub>2</sub> Max level provides very useful and important information.

### Recommendations

Research shows there is a definite need for annual physical fitness requirements for firefighters. It is expected that when a firefighter shows up on a scene he or she is able to perform their duties accurately and efficiently. The question this research was trying to answer is what is the best way to determine if a firefighter is “fit for duty”? While the CPAT has been proven a good tool for candidate physical ability testing it does not appear to be the answer for an annual ability test. The CPAT requires a lot of preparation, has transportability requirements and it not cost effective as a yearly test due to all the steps that have to be implemented to ensure the validity of the results. Meanwhile, by continuing to utilize the modified Combat Challenge and adding WFI protocols the assessment could be improved with minimal costs.

The IAFF and IAFC have recognized that physical ability assessments are an important part of the fire service and have implemented protocols to help departments in this area. I feel that following the protocols suggested by the WFI would be a cost effective way to monitor a firefighter’s physical fitness. The WFI monitors 5 components of fitness including monitoring V02 Max levels. These components include: Body Composition, Aerobic Capacity, Muscular Strength, Muscular Endurance, and Flexibility. All of the data that is collected by the medical

personnel needs to be kept in a secure location and strictly confidential. The reason that VO2 Max is important when it comes to fighting fires because it tells you the amount of oxygen that a person will need to perform a task. The WFI components can all be performed in house (workout room) or in the training facility. The Fairfield Fire Department currently has a medical expert on staff, who administers annual physical exams, including stress tests. During this test, the department could also get V02 Max levels on their employees. Should the department follow the protocols suggested by the WFI it would provide them with valid data on their firefighter's physical fitness levels.

The current Combat Challenge test is not a bad tool to use, along with another tool, to monitor a firefighter's physical ability. The tasks in Combat Challenge course have been researched and are job related tasks. Requiring firefighters to complete the course does allow the department to monitor the skill level of their employees, but it does not give a valid read on a firefighter's physical fitness level. That is why, in my opinion, if the department were to follow the protocols set up by the WFI and also require the Combat Challenge course to be completed by their employees, the data they collected would be more useful and in the long run improve the health and physical ability of their employees. By implementing the WFI fitness protocols the department would not be spending much additional money, it would not require any additional equipment, and it would provide concrete data on the physical fitness level of each employee.

The current SOP that is in place for people who fail the ability test would still be appropriate for people who fail the new ability assessment. Currently, the SOP's state the following: any person who fails to complete the test is required to get a "fit for duty" letter from their doctor and then have 6 months to re-take the test. If they pass the re-take they are clear for duty. However, if they fail the test they are required to do the following: see the department

physician for evaluation and re-take the test within 90 days. If a person was to fail the test for the third time they face the possibility of termination. (Appendix B)

In my opinion, there should be some reward or compensation for a person who passes the yearly ability assessment. This reward does not have to be monetary, it could be an extra 12 hours of comp time or vacation time.

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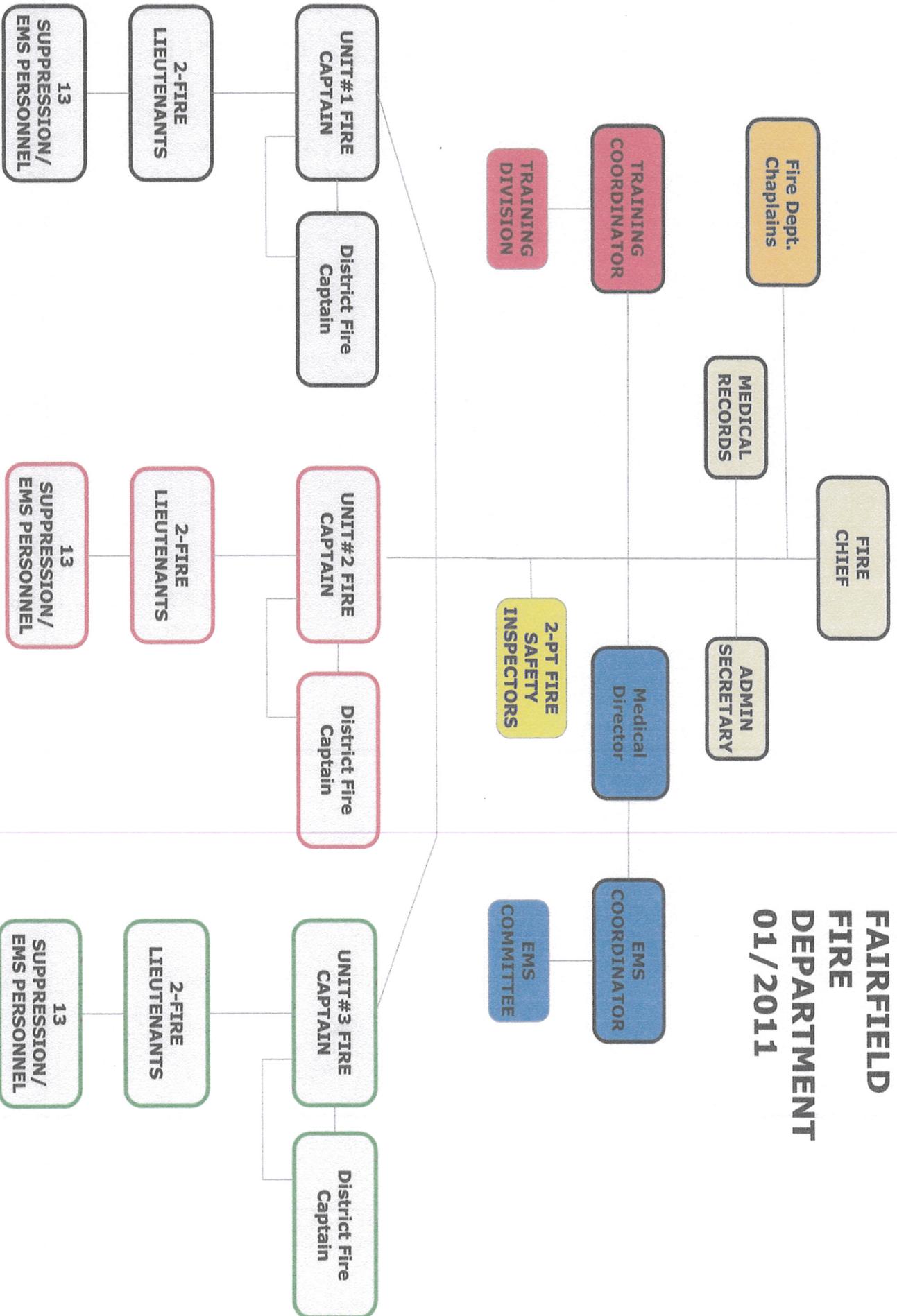
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# FAIRFIELD FIRE DEPARTMENT 01/2011





# Policy and Procedure Manual

Section: 5.08

Title: Physical Ability Test

Page: 1 of 8

Date: 07/11 Reviewed: 01/12

- 5.08.01 The Fairfield Fire Department will utilize a physical ability test as means to evaluate a candidate and/or current employee's ability to physically perform the essential functions associated with fire and emergency medical duties. The physical ability test is designed to evaluate an individual's overall body strength and cardiovascular endurance.
- 5.08.02 The development and administration of all aspects of the physical ability test shall be under the direct supervision of the Training Coordinator and the personnel assigned to the Training Division. Only personnel assigned to the Training Division shall administer the physical ability test.
- 5.08.03 The physical ability test shall be comprised of various stations that simulate, to the extent possible, physical tasks that would be considered common to performing the duties associated with the position of a Firefighter/EMT.
- 5.08.04** All participants (candidate and/or existing employees) shall be provided an orientation prior to reporting to the Training Complex. The orientation shall include both a visual presentation and verbal explanation of each evolution and what is required of each individual as they perform the evolution.
- 5.08.05 Prior to attempting to complete the physical ability test, each participant (candidate and/or current employee) shall undergo a medical screening consisting of measuring the blood pressure, resting pulse, respiratory rate, and mental status of the participant.

The following exclusion criteria shall be applied to all participants;

1. Blood pressure – diastolic greater than 105 mmHg.
2. Resting Pulse – Greater than 70% of the maximum heart rate calculated by using the formula  $(220 - \text{age} \times .7)$
3. Respiratory Rate – Greater than 24 per minute
4. Weight – No pre-entry exclusion
5. Mental Status – Altered mental status such as slurred speech, clumsiness, or weakness.

If any of the conditions are present, the participant shall be subject to a medical evaluation.



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5.08.06 The physical condition of each participant shall be visually monitored during the ability test by the assigned facilitator.

If any of the following conditions occur during the ability test, the process will be stopped immediately;

1. Changes in gait, speech, or behavior.
2. Complaints of chest pains, dizziness, shortness of breath, weakness, nausea, or headache.

5.08.07 Following the completion of the ability test each participant shall be subject to a post test medical evaluation utilizing the following guidelines;

1. Vital signs shall be taken immediately following completion of the ability test. Vital signs shall include blood pressure, pulse, respiratory rate, skin evaluation (color), and mental status.
2. Repeat monitoring of vital signs at 1, 5, and 10 minutes (if needed) until they return to less than 85% of the maximum heart rate.
3. If any of the following symptoms are present a medical evaluation may be warranted.
  - A. Greater than 85% of the maximum heart rate at 10 minutes.
  - B. Nausea
  - C. Vomiting
  - D. Diarrhea
  - E. Altered mental status
  - F. Respiratory, Cardiac, or Dermatologic Complaints.

**5.08.08** Each participant shall be provided a facilitator who will accompany the candidate through the entire physical ability test. The facilitator shall guide the participant to each station, indicate to the participant when each evolution has been successfully completed and provide the necessary motivation to encourage the participant to perform at their greatest potential.

5.08.09 The physical ability test shall be completed in one continuous evolution once the participant begins the physical ability test. A candidate must complete each evolution correctly and shall be required to complete the ability test within a time period not to exceed seven (7) minutes.



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5.08.10 In an effort to simulate the equipment worn during structural firefighting each participant will be required to wear a weight vest weighing approximately 30 pounds while completing the various evolutions.

5.08.11 The physical ability test shall be comprised of the following evolutions;

### Stair Climb with Hose Pack

This evolution will begin at the entrance door to the training tower and for timing purposes shall represent the initiation of the physical ability test once the participant steps through the entrance to the tower.

The participant shall shoulder a folded 50 ft. section of 2.5 hose and ascend to the top of the 4 story tower.

The participant may be permitted to skip steps during the ascent.

Upon reaching the top level of the training tower, the participant will drop the hose at the 4<sup>th</sup> floor window and progress to the LDH Hose Pull.

### LDH Hose Pull

The participant shall approach the 4<sup>th</sup> floor window after dropping the 2.5 inch hose.

The participant shall place his/her body firmly against the wall while extending their upper body slightly out the window.

The participant using a "hand over hand" method shall raise the LDH hose to the 4<sup>th</sup> floor window and lift the hose inside the training tower.



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## Grounds for Disqualification

Loss of control of the rope resulting in dropping the hose..

Stepping back from the window and pulling the rope over the window sill.

Failure to raise the LDH hose the entire distance and placing the hose inside the window.

## Stairwell Decent

Upon completion of the LDH Hose Pull, the participant shall initiate their decent from the 4<sup>th</sup> floor and shall be required to touch every step as they descend to the first floor.

## Ground for Disqualification

Failure to touch every step during the decent.

## Ventilation Simulator

Upon exiting the training tower, the participant shall proceed to the ventilation simulator where they will step up on the device, grasp the sledge hammer, and initiate striking the counter weight.

The participant shall continue to strike the counter weight moving to the rear of the simulator until verbally instructed to stop by the facilitator indicating the evolution has been completed.

## Grounds for disqualification

Failure to complete the task as directed by the facilitator.



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## 35' Ladder Extension and Lower

Upon completion of the ventilation simulator, the participant shall proceed to the 35' extension ladder raise and lower.

Utilizing only a "hand over hand" method the participant shall grasp the halyard and begin extending the ladder until it reaches the stops and is verbally instructed by the facilitator to begin lowering the ladder.

Utilizing only a "hand over hand" method the participant shall lower the ladder while maintaining control of the halyard at all times.

## 35' Ladder Extension and Lower (cont)

### Grounds for disqualification

Failure to fully extend the ladder.

Failure to control the various sections of the ladder while extending or lowering the ladder.

Failure to use the approved "hand over hand" method while extending or lowering the ladder.

Stepping on the halyard at anytime to compensate for lack of upper body strength.

Allowing the halyard to slip through the participants hands while lowering the ladder.



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## 1.75 inch Charged Hose Drag

Upon completion of the ladder evolution, the participant shall proceed to the 1.75 inch charged hose drag.

The participant shall grasp the nozzle, raise the hose to their shoulder, and proceed to drag the charged hose line a predetermined distance and verbally instructed by the facilitator that the evolution has been completed.

### Grounds for Disqualification

Failure to drag the charged hose line the required distance of the evolution.

## Victim Rescue Drag

Upon completion of the charged hose drag the participant shall proceed to the victim rescue drag.

Participant shall position and stand behind the rescue dummy, grasp each hand hold of the rescue harness located on each shoulder

While standing upright participant shall drag rescue dummy the predetermined distance

Participant will have the option to reposition their hands during the rescue dummy drag if necessary, however they are not permitted to lose control of or drop the rescue dummy during the drag.



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## Grounds for Disqualification

Failure to drag the rescue dummy the required distance.

Dropping or losing control of the rescue dummy during the evolution

### 5.08.12

The physical ability test shall be administered to current employees under the following guidelines:

1. All evolutions shall be completed as defined in Section 5.08.11.
2. **The employee shall not be held to a time limitation.**
3. It is expected that an employee will proceed from evolution to evolution without interruption, stopping, or resting once the physical ability test has begun; however an employee may be allotted a time **not to exceed 15 seconds** once they reach the next evolution for the purpose of acclimating themselves to completing the evolution.
4. With the exception of the rescue dummy drag, where an employee is afforded the opportunity to reposition their hands, all evolutions will be completed without interruption, resting, or stopping once they have begun.

### 5.08.13

In an effort to insure that current employees maintain a reasonable level of physical fitness required to safely perform the duties associated with their position, all employees assigned to fire suppression and emergency medical services shall be required to complete the physical ability test in May of each year. Failure to complete the ability test as outlined in Section 5.08.11 shall result in the employee being required to obtain a "fit for duty letter" in accordance with Section **4.67.10 or 4.67.11** indicating they are permitted to continue to perform the duties of a Firefighter/EMT. Within six (6) months of the initial test, the employee shall be required to perform the physical ability test and if they fail, will be referred to the department's physician for a physical evaluation.



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**5.08.14** If an employee fails to pass the physical ability test during their first attempt, it shall be the responsibility of the employee to initiate the steps necessary to improve their physical fitness to a level that will enable them to perform the tasks associated with their position without danger to themselves and others.

**5.08.15** The requirement for current employees to successfully complete the physical ability test on an annual basis shall be considered non-punitive for both the employee and the fire department. There is a reasonable expectation that an employee has an obligation to maintain a level of physical fitness necessary to safely perform the tasks associated with their position without jeopardizing their physical well being. In addition, there is a reasonable expectation that an employee will not place the fire department in a position of liability by expecting the fire department to allow them to continue to perform the duties of their position when they have not demonstrated their ability to do so, or have received written notification by a physician that they are not fit for duty.

**5.08.16** Although a current employee may have completed the ability as required by this policy; if by observation, a noticeable physical deficiency and/or a medical problem is suspected, that employee may be referred for a medical evaluation upon approval of the Fire Chief.

# APPENDIX A — Fitness Protocols

## WFI FITNESS Assessments

### OVERVIEW

Five components of fitness are being evaluated to determine a baseline level of fitness for fire service personnel and to measure progress from year to year. The five components are: Body Composition, Aerobic Capacity, Muscular Strength, Muscular Endurance, and Flexibility. Fitness assessments may be conducted by the designated fire department's certified fitness personnel. All data collected by the evaluator shall be maintained in a secure location and adhere to strict levels of confidentiality.

#### 1. Body Composition: Skinfold measurements

There are many techniques available to estimate body composition. The WFI recommends a three-site skinfold measurement to estimate body composition. When performed correctly, skinfold measurements yield reliable, accurate, and cost-effective estimates with a standard error of  $\pm 3.5\%$ .

#### 2. Aerobic Capacity: WFI Treadmill/WFI Stepmill

There are many assessments currently available to evaluate aerobic capacity. The WFI recommends two submaximal tests to predict maximum aerobic capacity, the WFI Treadmill Protocol and the WFI Stepmill Protocol. The formula for calculating the heart rate limit, or Target Heart Rate (THR), has been modified. In order to determine THR for these assessments refer to Table 5.5.

A maximal aerobic capacity test can also be used to obtain maximal VO<sub>2</sub> values. This protocol shall only be conducted in a medical facility under the supervision of a physician, including, ECG monitoring and resuscitation equipment.

#### 3. Muscular Strength:

##### Hand Grip, Static Arm, & Static Leg

There are many assessments currently available to evaluate maximum muscular strength. The WFI recommends isometric tests because they are reliable, valid, cost-effective, portable, easy to administer and safe. As with all forms of exercise there are inherent risks for injury; however, with comprehensive pre-screening, appropriate instruction, supervision, and proper execution, the risks are minimized.

##### Vertical Jump (Optional)

The Vertical Jump can be used as a substitute for the static leg strength evaluation. Some participants are apprehensive about the static leg dynamometer, despite the emphasis on prescreening, instruction, supervision and proper execution. This assessment may be offered as an alternative, but is not directly comparable to the results of static leg dynamometer. The static leg assessment evaluates muscular strength, which is only one component of power. The vertical jump employs a formula to calculate power, or the force produced by the legs to propel the body upward.

#### 4. Muscular Endurance:

##### Push-ups & Prone Static Plank

There are many protocols currently available to assess muscular endurance. The WFI recommends a combination of static and dynamic movements for evaluating muscular endurance, the prone static plank and push-ups.

##### Alternate Grip Push-up (Optional)

The alternate grip push-up (with stands) is an optional test for participants who experience muscular/skeletal discomfort in the performance of the standard WFI push-up. When utilizing the push-up handles, the height of the standard 5-inch range-of-motion prop must be adjusted to five inches, plus the height of the handles.

#### 5. Flexibility: Sit & Reach

There are many protocols currently available to measure flexibility. The WFI recommends the modified sit-and-reach assessment which is used to assess gross posterior muscle flexibility. This evaluation adjusts for the differences in limb length among participants.

#### Equipment

All evaluation equipment must be as specified in these protocols. Equipment must not be substituted unless otherwise indicated. All equipment must be maintained and properly calibrated in accordance with the manufacturer's instructions. Failure to do so may result in inaccurate or invalid data.

The WFI fitness assessment protocols, and the equipment needed to perform them, are described below:

### BODY COMPOSITION

- Lange Skinfold Calipers or equivalent
- Flexible tape measure
- Water-soluble marker

### AEROBIC CAPACITY

- Treadmill - The treadmill shall be a commercial treadmill capable of obtaining a minimum of 15% grade and 10 mph.
- Heart Rate Monitor
- Stopwatch
- Stepmill - The Stepmill should be a StairMaster 7000PT. Many generations of the Stepmill have been manufactured over the years. Consequently, the steps/min rate varies from model to model. The new WFI test was validated on a unit that has 20 intensity levels. It is imperative that the administrator insure that the unit is calibrated to the same steps-per-minute rate for each level indicated in the testing protocol. Refer to Table 5.0

Table 5.0  
Intensity (steps/min) for each level on the Stepmill

Level	Steps/min	Level	Steps/min
1	24	11	97
2	31	12	104
3	39	13	111
4	46	14	118
5	53	15	126
6	60	16	133
7	65	17	140
8	75	18	147
9	82	19	155
10	89	20	162

Note: If your Stepmill is not calibrated to the same steps/min rate as the 20-level table, the test may be invalid for your Stepmill. Please refer to the manufacturer for options.

### MUSCULAR STRENGTH

- Hand-Grip Dynamometer - Hand grip strength evaluations are performed with the JAMAR Hydraulic Hand dynamometer.
- Arm Dynamometer - The arm dynamometer shall be the Jackson Strength Evaluation System or a commercial dynamometer that includes an adjustable chain, handle bar, and test platform. The assessor must verify that the dynamometer is equivalent to the Jackson Strength Evaluation System.
- Leg Dynamometer - The leg dynamometer shall be the Jackson Strength Evaluation System or a commercial dynamometer system that includes an adjustable chain, and test platform. The assessor must verify that the dynamometer is equivalent to the Jackson Strength Evaluation System. A V-grip handlebar, or "chinning triangle," is required.
- Vertical Jump (Optional) - The vertical jump shall be evaluated using a timing mat to estimate the vertical distance traveled. The timing mat shall be the "Just Jump" mat from Probotics or other commercial timing mat. If an alternative device is used, the test administrator must verify that the device is equivalent to the Probotics "Just jump" mat.

### MUSCULAR ENDURANCE

- Static Plank - The static plank requires an exercise mat and a stopwatch.
- Push-up - The push-up evaluation requires a five-inch prop (e.g., cup, sponge), a metronome and a stopwatch. An exercise mat is optional.
- Alternate Grip Push-up (optional) - The alternate grip push-up requires a range-of-motion prop (e.g., cup, sponge), a metronome, stopwatch; and push-up stands or two 40 lb. hex dumbbells. Note: The range of motion prop shall be modified to ensure that the height is five inches, plus the height of the stands (e.g., a pair of five-inch push-up stands will require a ten-inch prop).

### FLEXIBILITY

- Sit-and-Reach - The equipment required is a Novel Acuflex I or equivalent trunk flexibility test device that compensates for variable arm and leg lengths.

## MANDATORY PRE-EVALUATION PROCEDURE

All personnel shall be medically cleared within the last 12 months prior to participating in the WFI assessments.

All personnel shall be health screened prior to conducting the WFI assessments (e.g., Par-Q, Health History).

Assessments shall be deferred if the following medical conditions exist:

- Chest pain, during or in the absence of physical activity
- Recent unexplained loss of consciousness
- Loss of balance due to dizziness (ataxia)
- Recent injury resulting in bone, joint or muscle problems that may be exacerbated by exercise
- Current prescribed drug that inhibits physical activity
- Chronic infectious disease (e.g., hepatitis)
- Pregnancy
- Any other reason the participant believes that he or she should not be physically evaluated

The following pre-evaluation procedure shall be conducted for all personnel prior to conducting fitness assessments:

- Obtain a resting heart rate and blood pressure. If resting heart rate is equal to or greater than 110 beats per minute and/or resting blood pressure is equal to or greater than 160/100 mm Hg, instruct the participant to rest for five minutes and re-evaluate. If the heart rate and/or blood pressure remain at these levels, cancel the fitness evaluation and refer the participant to the fire department physician. If the heart rate and/or blood pressure fall within the acceptable range, the assessment may continue.

The assessor shall:

- Instruct the participants to refrain from eating, drinking, smoking and any physical activity that may influence performance prior to the assessment. Activities that affect heart rate and/or blood pressure measurements may adversely impact performance.
- Assure that participants are wearing appropriate attire.
- Record participants' age.
- Inform participants of the appropriate execution for each protocol.

## ASSESSMENT SEQUENCE

The assessments are sequenced to minimize the effect of fatigue on subsequent performance, and to mitigate injury. The WFI requires that assessments be performed in the following sequence:

1. Body composition
2. Aerobic capacity
3. Muscular strength/power
4. Muscle endurance
5. Flexibility

Note: Personnel should have the opportunity to recover from the previous assessment before proceeding to the next.

## INDICATIONS FOR STOPPING EVALUATION

- Onset of angina or angina-like symptoms
- Signs of poor perfusion: light-headedness, confusion, ataxia, poor pallor, cyanosis, nausea, or cold, clammy skin
- Failure of heart rate to increase with increase in exercise intensity
- Participant requests evaluation to stop
- Physical or verbal manifestations of severe fatigue
- Joint or muscle pain that becomes aggravated with exercise
- Failure of the testing equipment

## WFI ASSESSMENT PROTOCOLS BODY COMPOSITION

### EQUIPMENT

- Large Skinfold Calipers or equivalent
- Flexible tape measure
- Water-soluble marker

### ASSESSMENT

- Conduct pre-evaluation procedures.
- Obtain the participant's age.
- Note the gender-specific skinfold sites. Men are measured at the triceps, subscapular and pectoral sites; women are measured at the triceps, abdominal and suprailiac sites.
- All measurements should be made on the right side of the body, with the subject standing upright.
- Use the tape measure to mark the site to be measured with a water-soluble marker.
- Place calipers directly on the skin surface, 1 cm away from the thumb and finger; perpendicular to the skinfold; and halfway between the crest and base of the fold.
- Maintain pinch while reading the caliper.
- Wait 1 – 2 seconds (not longer,) before reading caliper.
- Rotate through all three sites or allow time for skin to regain normal texture and thickness.
- Take two measurements at each site. If the values are less than 1 millimeter of each other then calculate the average of the two measurements.
- If the difference between the two measurements is greater than or equal to 1 millimeter, then a third measurement must be taken.

If the differences between the three skinfold measurements are equal, then calculate the average of all three measurements. [e.g., (1) 6 mm, (2) 9mm, (3) 12 mm the average of all three measurements is 9 mm.]

If the three measurements are **not** equal distance apart then calculate the average of the two closest measurements. [e.g., (1) 7mm, (2) 4 mm, (3) 5 mm the average is calculated for measurement #2 and #3 only. The average of the two measurements is 4.5 mm.]

Once the skinfolds are collected for all three sites, calculate the sum of the average skinfold measurement for each site. (Note: Sites are specific to gender.)

To determine body fat percentage, cross-reference the sum of skin folds with the subject's age on the appropriate chart provided in this section (male - table 5.1; female - table 5.2).

### MALE SKINFOLD SITES

- **Triceps** - located at the midpoint between the acromioclavicular (AC) joint and the olecranon process (center of the elbow) on the posterior aspect of the upper arm.

Figure 5.0



Figure 5.1



- **Subscapular** - located on the same diagonal line as the inferior border of the scapula, 2cm beyond the inferior angle.

Figure 5.2



Figure 5.3



- **Pectoral** - Located on a diagonal line, midway between the axillary fold and the right nipple.

Figure 5.4

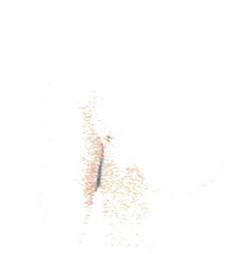


Figure 5.5



### FEMALE SKINFOLD SITES

- **Triceps** – located at the midpoint between the acromio-clavicular (AC) joint and the olecranon process (center of the elbow) on the posterior aspect of the upper arm.

Figure 5.6



Figure 5.7



- **Abdominal** – located at the right of the umbilicus, on a vertical fold, 2cm from the right lateral border.

Figure 5.8



Figure 5.9



- **Suprailiac** – located on a diagonal line, 1-2 cm anterior to the crest of the pelvis (ASIS). Grasp a diagonal skinfold just above and slightly forward of the crest of the Ilium.

Figure 5.10



Figure 5.11



Table 5.1  
 Percentage of Body Fat estimate for **MEN**  
 Based on the Sum of Triceps, Subscapular, and Pectoral Skinfolds

Skinfolds Sum (mm)	Age up to Last Complete Year								
	Under 22	23 - 27	28 - 32	33 - 37	38 - 42	43 - 47	48 - 52	53 - 57	Over 57
8 - 10	1.5	2.0	2.5	3.1	3.6	4.1	4.6	5.1	5.6
11 - 13	3.0	3.5	4.0	4.5	5.1	5.6	6.1	6.6	7.1
14 - 16	4.5	5.0	5.5	6.0	6.5	7.0	7.6	8.1	8.6
17 - 19	5.9	6.4	6.9	7.4	8.0	8.5	9.0	9.5	10.0
20 - 22	7.3	7.8	8.3	8.8	9.4	9.9	10.4	10.9	11.4
23 - 25	8.6	9.2	9.7	10.2	10.7	11.2	11.8	12.3	12.8
26 - 28	10.0	10.5	11.0	11.5	12.1	12.6	13.1	13.6	14.2
29 - 31	11.2	11.8	12.3	12.8	13.4	13.9	14.4	14.9	15.5
32 - 34	12.5	13.0	13.5	14.1	14.6	15.1	15.7	16.2	16.7
35 - 37	13.7	14.2	14.8	15.3	15.8	16.4	16.9	17.4	18.0
38 - 40	14.9	15.4	15.9	16.5	17.0	17.6	18.1	18.6	19.2
41 - 43	16.0	16.6	17.1	17.6	18.2	18.7	19.3	19.8	20.3
44 - 46	17.1	17.7	18.2	18.7	19.3	19.8	20.4	20.9	21.5
47 - 49	18.2	18.7	19.3	19.8	20.4	20.9	21.4	22.0	22.5
50 - 52	19.2	19.7	20.3	20.8	21.4	21.9	22.5	23.0	23.6
53 - 55	20.2	20.7	21.3	21.8	22.4	22.9	23.5	24.0	24.6
56 - 58	21.1	21.7	22.2	22.8	23.3	23.9	24.4	25.0	25.5
59 - 61	22.0	22.6	23.1	23.7	24.2	24.8	25.3	25.9	26.5
62 - 64	22.9	23.4	24.0	24.5	25.1	25.7	26.2	26.8	27.3
64 - 67	23.7	24.3	24.8	25.4	25.9	26.5	27.1	27.6	28.2
68 - 70	24.5	25.0	25.6	26.2	26.7	27.3	27.8	28.4	29.0
71 - 73	25.2	25.8	26.3	26.9	27.5	28.0	28.6	29.1	29.7
74 - 76	25.9	26.5	27.0	27.6	28.2	28.7	29.3	29.9	30.4
77 - 79	26.6	27.1	27.7	28.2	28.8	29.4	29.9	30.5	31.1
80 - 82	27.2	27.7	28.3	28.9	29.4	30.0	30.6	31.1	31.7
83 - 85	27.7	28.3	28.8	29.4	30.0	30.5	31.1	31.7	32.3
86 - 88	28.2	28.8	29.4	29.9	30.5	31.1	31.6	32.2	32.8
89 - 91	28.7	29.3	29.8	30.4	31.0	31.5	32.1	32.7	33.3
92 - 94	29.1	29.7	30.3	30.8	31.4	32.0	32.6	33.1	33.4
95 - 97	29.5	30.1	30.6	31.2	31.8	32.4	32.9	33.5	34.1
98 - 100	29.8	30.4	31.0	31.6	32.1	32.7	33.3	33.9	34.4
101 - 103	30.1	30.7	31.3	31.8	32.4	33.0	33.6	34.1	34.7
104 - 106	30.4	30.9	31.5	32.1	32.7	33.2	33.8	34.4	35.0
107 - 109	30.6	31.1	31.7	32.3	32.9	33.4	34.0	34.6	35.2
110 - 112	30.7	31.3	31.9	32.4	33.0	33.6	34.2	34.7	35.3
113 - 115	30.8	31.4	32.0	32.5	33.1	33.7	34.3	34.9	35.4
116 - 118	30.9	31.5	32.0	32.6	33.2	33.8	34.3	34.9	35.5

Table 5.2  
 Percentage of Body Fat estimates for **WOMEN**  
 Based on the Sum of Triceps, Abdominal, and Suprailiac Skinfolts

Skinfolts Sum (mm)	Age up to Last Complete Year								
	18 - 22	23 - 27	28 - 32	33 - 37	38 - 42	43 - 47	48 - 52	53 - 57	Over 57
8 - 12	8.8	9.0	9.2	9.4	9.5	9.7	9.9	10.1	10.3
13 - 37	<b>10.8</b>	<b>10.9</b>	<b>11.0</b>	<b>11.3</b>	<b>11.5</b>	<b>11.7</b>	<b>11.8</b>	<b>12.0</b>	<b>12.2</b>
18 - 22	12.6	12.8	13.0	13.2	13.4	13.5	13.7	13.9	14.1
23 - 27	<b>14.5</b>	<b>14.6</b>	<b>14.8</b>	<b>15.0</b>	<b>15.2</b>	<b>15.4</b>	<b>15.6</b>	<b>15.7</b>	<b>15.9</b>
28 - 32	16.2	16.4	16.6	16.8	17.0	17.1	17.3	17.5	17.7
33 - 37	<b>17.9</b>	<b>18.1</b>	<b>18.3</b>	<b>18.5</b>	<b>18.7</b>	<b>18.9</b>	<b>19.0</b>	<b>19.2</b>	<b>19.4</b>
38 - 42	19.6	19.8	20.0	20.2	20.3	20.5	20.7	20.9	21.1
43 - 47	<b>21.2</b>	<b>21.4</b>	<b>21.6</b>	<b>21.8</b>	<b>21.9</b>	<b>22.1</b>	<b>22.3</b>	<b>22.5</b>	<b>22.7</b>
48 - 52	22.8	22.9	23.1	23.3	23.5	23.7	23.8	24.0	24.2
53 - 57	<b>24.2</b>	<b>24.4</b>	<b>24.6</b>	<b>24.8</b>	<b>25.0</b>	<b>25.2</b>	<b>25.3</b>	<b>25.5</b>	<b>25.7</b>
58 - 62	25.7	25.9	26.0	26.2	26.4	26.6	26.8	27.0	27.1
63 - 67	<b>27.1</b>	<b>27.2</b>	<b>27.4</b>	<b>27.6</b>	<b>27.8</b>	<b>28.0</b>	<b>28.2</b>	<b>28.3</b>	<b>28.5</b>
68 - 72	28.4	28.6	28.7	28.9	29.1	29.3	29.5	29.7	29.8
73 - 77	<b>29.6</b>	<b>29.8</b>	<b>30.0</b>	<b>30.2</b>	<b>30.4</b>	<b>30.6</b>	<b>30.7</b>	<b>30.9</b>	<b>31.1</b>
78 - 82	30.9	31.0	31.2	31.4	31.6	31.8	31.9	32.1	32.3
83 - 87	<b>32.0</b>	<b>32.2</b>	<b>32.4</b>	<b>32.6</b>	<b>32.7</b>	<b>32.9</b>	<b>33.1</b>	<b>33.3</b>	<b>33.5</b>
88 - 92	33.1	33.3	33.5	33.7	33.8	34.0	34.2	34.4	34.6
93 - 97	<b>34.1</b>	<b>34.3</b>	<b>34.5</b>	<b>34.7</b>	<b>34.9</b>	<b>35.1</b>	<b>35.2</b>	<b>35.4</b>	<b>35.6</b>
98 - 102	35.1	35.3	35.5	35.7	35.9	36.0	36.2	36.4	36.6
103 - 107	<b>36.1</b>	<b>36.2</b>	<b>36.4</b>	<b>36.6</b>	<b>36.8</b>	<b>37.0</b>	<b>37.2</b>	<b>37.3</b>	<b>37.5</b>
108 - 112	36.9	37.1	37.3	37.5	37.7	37.9	38.0	38.2	38.4
113 - 117	<b>37.8</b>	<b>37.9</b>	<b>38.1</b>	<b>38.3</b>	<b>39.2</b>	<b>39.4</b>	<b>39.6</b>	<b>39.8</b>	<b>39.2</b>
118 - 122	38.5	38.7	38.9	39.1	39.4	39.6	39.8	40.0	40.0
123 - 127	<b>39.2</b>	<b>39.4</b>	<b>39.6</b>	<b>39.8</b>	<b>40.0</b>	<b>40.1</b>	<b>40.3</b>	<b>40.5</b>	<b>40.7</b>
128 - 132	39.9	40.1	40.2	40.4	40.6	40.8	41.0	41.2	41.3
133 - 137	<b>40.5</b>	<b>40.7</b>	<b>40.8</b>	<b>41.0</b>	<b>41.2</b>	<b>41.4</b>	<b>41.6</b>	<b>41.7</b>	<b>41.9</b>
138 - 142	41.0	41.2	41.4	41.6	41.7	41.9	42.1	42.3	42.5
143 - 147	<b>41.5</b>	<b>41.7</b>	<b>41.9</b>	<b>42.0</b>	<b>42.2</b>	<b>42.4</b>	<b>42.6</b>	<b>42.8</b>	<b>43.0</b>
148 - 152	41.9	42.1	42.3	42.8	42.6	42.8	43.0	43.2	43.4
153 - 157	<b>43.3</b>	<b>42.5</b>	<b>42.6</b>	<b>42.8</b>	<b>43.0</b>	<b>43.2</b>	<b>43.4</b>	<b>43.6</b>	<b>43.7</b>
158 - 162	42.6	42.8	43.0	43.1	43.3	43.5	43.7	43.9	44.1
163 - 167	<b>42.9</b>	<b>43.0</b>	<b>43.2</b>	<b>43.4</b>	<b>43.6</b>	<b>43.8</b>	<b>44.0</b>	<b>44.1</b>	<b>44.3</b>
168 - 172	43.1	43.2	43.4	43.6	43.8	44.0	44.2	44.3	44.5
173 - 177	<b>43.2</b>	<b>43.4</b>	<b>43.6</b>	<b>43.8</b>	<b>43.9</b>	<b>44.1</b>	<b>44.3</b>	<b>44.5</b>	<b>44.7</b>
178 - 182	43.3	43.5	43.7	43.8	44.0	44.2	44.4	44.6	44.8

## WFI AEROBIC CAPACITY EVALUATIONS

There are two submaximal assessments to determine a fire fighter's aerobic capacity: the WFI submaximal treadmill and the WFI sub-maximal Stepmill. Using the calculations provided in the respective section, both assessments estimate a fire fighter's maximal aerobic capacity, expressed as  $VO_2$  max. Either the treadmill or Stepmill can be used as long as the results are calculated using the appropriate assessment formula. All aerobic capacity evaluation results must be recorded in milliliters (ml) of oxygen per kilogram (kg) of body weight per minute ( $VO_2$  max).

These aerobic assessments are submaximal and are based on the heart rate response during graded exercise. Accurate estimation of maximal heart rate (MHR) is critical to the submaximal prediction used in these assessments. A new formula for calculating maximal heart rate is utilized with these protocols, because it more accurately accounts for age-related reduction of MHR than did the previous formula (Table 5.5). Be aware that the heart rate can be affected by variables such as body temperature, hydration state, anxiety, stress and medications. In addition to heart rate, body mass (height-to-weight ratio), is also a significant variable in both prediction equations. The relationship between height and weight is recorded as Body Mass Index (BMI). It is important to note that BMI is not being used in these aerobic protocols to estimate body composition; but rather, is used to represent the mass of each participant. Whereas all predictive tests are subject to varying degrees of error, it is believed that these new changes will provide vast improvements from previous protocols in reliability, validity and accuracy in estimating  $VO_2$  max.

## PRE-EVALUATION PROCEDURES

Choose the aerobic capacity protocol and worksheet.

Measure the participant's:

- Resting heart rate
- Resting blood pressure
- Age
- Height
- Weight
- Gender

- Determine the participants Body Mass Index (BMI) Refer to Table 5.3 & Table 5.4

- Determine the Target Heart Rate (THR). Refer to table 5.5 to determine the appropriate exercise heart rate for the participant's age.

- Record the target exercise heart rate on the protocol worksheet.

- Inform the participant of all evaluation components. Ensure that the participant is in proper clothing and footwear.

- Review all indicators for stopping the evaluation with the participant.

Secure heart rate monitor transmitter around the participant's chest in accordance with the manufacturer's instructions. Evaluator shall hold or wear the heart rate monitor wrist receiver.

Table 5.3

Body Mass Index (BMI) formulas

Metric	US
$BMI = \frac{Weight (kg)}{Height (m)^2}$	$BMI = \frac{Weight (lb)}{Height (in)^2}$

Table 5.4 Body Mass Index (BMI) Conversion Table

BMI	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Height	Body Weight (pounds)																														
58' (4'10")	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167	172	177	181	186	191	196	201	205	210	215	220	224	229	234	239
59' (4'11")	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173	178	183	188	193	198	203	208	212	217	222	227	232	237	242	247
60' (5)	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179	184	189	194	199	204	209	215	220	225	230	235	240	245	250	255
61' (5'1")	105	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185	190	195	201	206	211	217	222	227	232	238	243	248	254	259	264
62' (5'2")	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191	196	202	207	213	218	224	229	235	240	245	251	256	262	267	273
63' (5'3")	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197	203	208	214	220	225	231	237	242	248	254	259	265	270	278	282
64' (5'4")	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204	209	215	221	227	232	238	244	250	256	262	267	273	279	285	291
65' (5'5")	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252	258	264	270	276	282	288	294	300
66' (5'6")	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216	223	229	235	241	247	253	260	266	272	278	284	291	297	303	309
67' (5'7")	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223	230	236	242	249	255	261	268	274	280	287	293	299	306	312	319
68' (5'8")	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230	236	243	249	256	262	269	276	282	289	295	302	308	315	322	328
69' (5'9")	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236	243	250	257	263	270	277	284	291	297	304	311	318	324	331	338
70' (5'10")	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243	250	257	264	271	278	285	292	299	306	313	320	327	334	341	348
71' (5'11")	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250	257	264	271	278	285	292	299	306	313	320	327	334	341	348	355
72' (6)	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258	265	272	279	287	294	302	309	316	324	331	338	346	353	361	368
73' (6'1")	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265	272	280	288	295	302	310	318	325	333	340	348	355	363	371	378
74' (6'2")	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272	279	287	295	303	311	319	327	335	343	351	359	367	375	383	391
75' (6'3")	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279	287	295	304	312	320	328	336	344	353	361	369	377	385	394	402
76' (6'4")	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287	295	304	312	320	328	336	344	353	361	369	377	385	394	402	410
BMI	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

Table 5.5  
Target Heart Rate for Respective Age

Age (yrs)	THR (BPM)						
18	166	29	160	40	153	51	146
19	165	30	159	42	152	52	146
20	165	31	158	42	152	53	145
21	164	32	158	43	151	54	145
22	164	33	157	44	151	55	144
23	163	34	157	45	150	56	143
24	163	35	156	46	149	57	143
25	162	36	155	47	149	58	142
26	161	37	155	48	148	59	142
27	161	38	154	49	148	60	141
28	160	39	154	50	147	61	140

THR Formula:  $[208 - (0.7 \times \text{age})] \times 0.85$

## WFI AEROBIC CAPACITY EVALUATIONS

### TREADMILL EVALUATION

#### Equipment

- Commercial Grade Treadmill
- Calculator
- Stopwatch
- Heart Rate Monitor
- Height Scale
- Weight Scale

Figure 5.12



### TREADMILL EVALUATION

#### ASSESSMENT

The purpose of this assessment is to estimate the VO<sub>2</sub> max of each participant.

1. Conduct Pre-Evaluation Procedures.
2. The participant straddles the treadmill belt until it begins to move. When the treadmill reaches approximately 1 mph, instruct the participant to step onto the belt. Then increase the speed to 3 mph at 0% grade. Monitor the participant's heart rate continuously throughout the assessment.

Figure 5.12

Time	Speed mph	%Grade
0:00 - 1:00	3.0	0
1:01 - 2:00	3.0	0
2:01 - 3:00	3.0	0
3:01 - 4:00	4.5	0
4:01 - 5:00	4.5	2
5:01 - 6:00	5.0	2
6:01 - 7:00	5.0	4
7:01 - 8:00	5.5	4
8:01 - 9:00	5.5	6
9:01 - 10:00	6.0	6
10:01 - 11:00	6.0	8
11:01 - 12:00	6.5	8
12:01 - 13:00	6.5	10
13:01 - 14:00	7.0	10
14:01 - 15:00	7.0	12
15:01 - 16:00	7.5	12
16:01 - 17:00	7.5	14
17:01 - 18:00	8.0	14
Recovery Phase		
0:00 - 1:00	3.0	0
1:01 - 2:00	3.0	0
2:01 - 3:00	3.0	0

3. Start the stopwatch when the treadmill reaches 3 mph at 0% grade. Continue with this speed and grade for 3 minutes (steady state).
4. After completing the 3-minute steady state interval, inform the participant that the speed will increase to 4.5 mph.
5. Advise the participant that the assessment is a series of 1-minute intervals, alternating between speed and percent grade. All subsequent speed increases occur at 0.5 mph.
6. At 4:01 minutes, increase the grade from 0% to 2%. At this time, inform the participant that all subsequent grade increases occur at 2% intervals.
7. The assessment will continue until the participant's heart rate exceeds the THR rate for 15 seconds, or the subject exhibits the medical criteria for early termination.
8. Once the heart rate exceeds the Target Heart Rate (THR), note the time and continue the assessment for an additional 15 seconds. Do not make any changes to the assessment speed or grade during this time. If the participant's heart rate remains above the THR for the full 15 seconds, then stop the assessment and proceed to the cool-down phase. Record the total time, including the 3-minute warm-up, at which point the participant exceeds the THR. If the participant's heart rate exceeds the target, but then drops back to the THR or below within 15 seconds, then the assessment should continue.

The assessment is not complete until the participant's heart rate exceeds the THR for 15 seconds. If this does not occur within 18 minutes, then terminate the assessment and record the time.

9. Once the assessment is completed, the time is recorded. The participant should perform a cool-down for a minimum of 3 minutes at 3 mph, 0% grade. Continue to monitor the heart rate during the cool-down. Record the recovery heart rate at 1 minute of cool-down.

**TERMINATE THE ASSESSMENT IF ANY OF THE FOLLOWING OCCURS:**

- a. The THR is exceeded for 15 seconds.
  - b. The THR has not been met after 18 minutes.
  - c. The participant asks to terminate the exercise.
  - d. The equipment malfunctions.
  - e. Medical conditions arise that prohibit completing the assessment.
- Record the reason for terminating the assessment and the initial time the THR was exceeded (if applicable). Record time in minutes and convert second(s) into decimal. See Treadmill Formula and Table 5.6
  - Use the test time (TT) the participant completed the assessment (i.e. exceeded the THR) along with the treadmill conversion formula to estimate VO<sub>2</sub> max.
  - Record the VO<sub>2</sub> max.

**Treadmill Sub-maximal VO<sub>2</sub> Prediction Formula**  

$$VO_{2max} = 56.981 + (1.242 \times TT) - (0.805 \times BMI)$$

Table 5.6  
Seconds converted to decimal

Time seconds	Decimal Equivalent	Time seconds	Decimal Equivalent	Time seconds	Decimal Equivalent
1	0.02	21	0.35	41	0.68
2	0.03	22	0.37	42	0.70
3	0.05	23	0.38	43	0.72
4	0.07	24	0.40	44	0.73
5	0.08	25	0.42	45	0.75
6	0.10	26	0.43	46	0.77
7	0.12	27	0.45	47	0.78
8	0.13	28	0.47	48	0.80
9	0.15	29	0.48	49	0.82
10	0.17	30	0.50	50	0.83
11	0.18	31	0.52	51	0.85
12	0.20	32	0.53	52	0.87
13	0.22	33	0.55	53	0.88
14	0.23	34	0.57	54	0.90
15	0.25	35	0.58	55	0.92
16	0.27	36	0.60	56	0.93
17	0.28	37	0.62	57	0.95
18	0.30	38	0.63	58	0.97
19	0.32	39	0.65	59	0.98
20	0.33	40	0.67	60	1.00

\*Note: TT is the time in minutes that the participant's THR was exceeded and the test terminated

Example of the computations required to calculate VO<sub>2</sub> max:  
 Age: 48 yrs  
 Weight: 221 lbs  
 Height: 6'  
 BMI = 30  
 THR = 148 bpm  
 Example Scenario:  
 At 7 minutes and 32 seconds the participant exceeds their THR. They continue with the assessment for the additional 15 second monitoring period. The HR remained above their THR. Test terminated and time recorded at 7min 32 sec.  
 Using Table 5.6 convert 32 seconds to decimal = .53  
 7 min + .53 = test time 7.53  
 Calculate VO<sub>2</sub> using treadmill formula:  
 $VO_2 = 56.981 + (1.242 \times \text{time}) - (0.805 \times BMI)$   
 $VO_2 = 56.981 + (1.242 \times 7.53) - (0.805 \times 30)$   
 $VO_2 = 56.853 + 9.35 - 24.15$   
 $VO_2 = 42.1$

## STAIRMILL EVALUATION

### Equipment

- StairMaster 7000 PT Stepmill
- Heart Rate Monitor
- Stopwatch
- Height/Weight Scale
- Calculator

Stairmill Evaluation  
Figure 5.13



### ASSESSMENT

The purpose of this assessment is to estimate the  $VO_2$  max of each participant.

- Conduct Pre-Evaluation Procedures.
- Monitor the participant's heart rate continuously throughout the assessment.
- Instruct the participant to temporarily grasp the handrails to reduce the possibility of losing balance when the stairs begin to move.
- The starting position is approximately two-thirds of the way up the stairs.
- The assessment starts at level 4 for 2 minutes, then level 5 for 1 minute (warm-up period). Start the stopwatch once the Stepmill begins. Inform the participant that the evaluation is a series of 1-minute intervals with increasing work loads on each subsequent minute.
- Once the assessment commences, do not allow the participant to hold or lean on the handrails; this will result in overestimation of aerobic capacity.
- At the completion of the 3 minute-warm-up, proceed to level 7 for 1 minute. \*Note: This is marked by increasing the workload from level 5 to level 7.
- Once the heart rate exceeds the Target Heart Rate (THR), note the time and continue the assessment for an additional 15 seconds. Do not make any changes to the assessment intensity level during this time. If the participant's heart rate remains above the THR for the

Time	Level	Step/min
0:00 – 1:00	4	46
1:01 – 2:00	4	46
2:01 – 3:00	5	53
3:01 – 4:00	7	65
4:01 – 5:00	8	75
5:01 – 6:00	9	82
6:01 – 7:00	10	89
7:01 – 8:00	11	97
8:01 – 9:00	12	104
9:01 – 10:00	13	111
10:01 – 11:00	14	118
11:01 – 12:00	15	126
12:01 – 13:00	16	133
13:01 – 14:00	17	140
14:01 – 15:00	18	147
15:01 – 16:00	19	155
<b>Recovery Phase</b>		
0:00 – 1:00	3	39
1:01 – 2:00	3	39

full 15 seconds, then the participant has completed the assessment. Stop the assessment and record the time at which the participant exceeded the THR. The total Test Time (TT) begins from the time the participant starts on the Stepmill, to the point at which the participant exceeds their THR. It does not include the final 15 second monitoring period that the heart rate was above the THR.

- The assessment is complete once the participant's heart rate exceeds the target for 15 seconds. If the participant's heart rate exceeds the target, but then drops down to the THR or below within 15 seconds, then the assessment should continue.
- Once the assessment is completed, the participant will cool down for a minimum of 2 minutes at level 3. Continue to monitor the heart rate during the cool-down. Record the recovery heart rate at one minute of cool-down. The participant may grasp the handrails during the cool-down phase.
- Upon completion of the cool-down, instruct the participant to grasp the handrails. Stop the Stepmill and assist the participant off the apparatus.

**TERMINATE THE ASSESSMENT IF ANY OF THE FOLLOWING OCCURS:**

- The participant's heart rate exceeds THR for 15 seconds.
- The THR has not been met after 16 minutes.
- The participant asks to terminate the exercise.
- The equipment malfunctions.
- Medical conditions arise that prohibit completing the assessment.
- Record the reason for terminating the assessment and the initial time the heart rate had been exceeded (if applicable). Record time in minutes and convert second(s) into decimal. See Table 5.6
- Insert the test time (TT) at which the participant completed the assessment, along with the stepmill conversion formula to estimate  $VO_2$  max.
- Record the  $VO_2$  max.

**Stepmill Sub-maximal  $VO_2$  Prediction Formula**

$$VO_2\text{max} = 57.774 + (1.757 \times TT) - (0.904 \times BMI)$$

\*Note: TT is the time in minutes that the participant's THR was exceeded and the test terminated

The following example illustrates the computations required to calculate  $VO_2$  max for the stepmill.

Age: 48 yrs      Weight: 221 lbs    Height: 6'  
BMI = 30      THR = 148 bpm

**Example Scenario:**

At 5 minutes and 8 seconds the participant exceeds THR. Continue with the assessment for the additional 15 second monitoring period. If after 10 seconds of monitoring, the participant's heart rate drops below the THR, the appropriate course of action is to continue with the assessment as if the participant hadn't exceeded the THR.

At 5 minutes and 52 seconds, the participant again exceeds the THR, continue with the assessment for the additional 15-second monitoring period. Should the participant's HR stay above the THR during the 15-second monitoring period, the test would be terminated and the time recorded at 5 min 52 sec.

Using Table 5.6 convert 52 seconds to decimal = .87

5 min + .87 = test time 5.87

Calculate the  $VO_2$  using stepmill formula:

$$VO_2 = 57.774 + (1.757 \times TT) - (0.904 \times BMI)$$

$$VO_2 = 57.774 + (1.757 \times 5.87) - (0.904 \times 30)$$

$$VO_2 = 57.774 + 10.31 - 27.12$$

$$VO_2 = 40.96$$

$$VO_2 = 41 \text{ ml/kg/min}$$

## WFI GRIP STRENGTH

### Equipment

- JAMAR Hydraulic Hand dynamometer
- Towel

Figure 5.14



### ASSESSMENT

The purpose of this assessment is to evaluate the maximum isometric muscular strength of the flexor muscles of the hands. There is a strong correlation between hand grip strength and upper body strength.

- Conduct Pre-Evaluation Procedures.
- Instruct the participant to towel-dry hands.
- Place the dynamometer in the participant's hand to be sized for assessment. Ensure that the hand grip is adjusted to fit snugly in the first proximal interphalangeal joint. Prior to commencing the assessment, set the dynamometer to "zero" by rotating the red peak force indicator counterclockwise.
- Advise the participant that the evaluation is a series of 6 trials, 3 for each hand, alternating hands with each attempt.
- The participant will maintain the following positions for the duration of the assessment:
  - Stand upright with spine in neutral alignment.
  - Flex elbow at a 90° angle.
  - Adduct shoulder and place hand in neutral grip position (hand shake position).
- The participant will squeeze the device with maximum force for 3 seconds while exhaling.
- The participant will slowly release grip. The needle will automatically record the highest force exerted.
- Measure both hands, alternating between right and left, completing three trials per hand.
- Reset the peak-hold needle to zero before obtaining new readings.
- Record the scores for each trial in each hand to the nearest kilogram.
- Record the highest score for each hand.

## WFI ARM STRENGTH

### Equipment

- Jackson Strength Evaluation System with or verified equivalent dynamometer
- Straight Handlebar
- Towel

Figure 5.15



### ASSESSMENT

The purpose of this assessment is to evaluate the maximum isometric strength of the flexor muscles of the arm.

- Conduct Pre-Evaluation Procedures.
- Participant will towel-dry hands.
- Advise the participant that the evaluation is a series of 3 trials in which the he will "ease into" the isometric arm contraction and release slowly, without moving the arms or jerking hands.
- Place the dynamometer base plate on a level and secure surface.
- Have the participant stand upon the dynamometer base plate, with feet shoulder width apart and equal distance from the chain. The chain should travel vertically from the base to the hands.
- The participant will stand erect with knees straight and arms flexed at 90° in the sagittal plane.
- The participant will hold the bar with a wide grip and bend elbows at 90°.
- Participants must stand erect without arching back.
- Adjust the chain so that the bar can be held in the hands while the arms are flexed at 90° in the sagittal plane.
- Ensure that elbows remain adducted.
- Verify this position and ensure the chain is taut.
- The participant **must not** shrug shoulders, bend back, or perform any other motion other than biceps flexion in an attempt to move the handlebar in a vertical direction.
- The participant will flex maximally for 3 seconds.
- After 3 seconds, the participant will slowly relax arms, and remain at a standing rest for 30 seconds.
- Once the participant has completed the 30-second recovery period, begin the 2<sup>nd</sup> trial.
- Repeat evaluation for the 3<sup>rd</sup> trial using the same procedure.
- Record the three trials to the nearest kilogram.
- Record the highest trial.

Note: Digital readout will display both the peak force ("p") and the average force ("a") achieved during the three evaluations.

## WFI LEG STRENGTH

### Equipment

- Jackson Strength Evaluation System or Verified equivalent dynamometer
- V-Grip Handlebar
- Towel
- Weight lifting belt (optional)

Figure 5.16



### ASSESSMENT

- The purpose of this assessment is to evaluate the maximum isometric strength of the lower body by performing a static dead lift.
- Conduct Pre-Evaluation Procedures.
- The participants will towel-dry hands.
- The participant may use weight-lifting belts for support.
- Advise the participant that the evaluation is a series of 3 trials.
- Place the dynamometer base plate on a level and secure surface. Have the participant stand upon the dynamometer base plate, with feet spread shoulder width apart and equal distance from the lifting chain. Inform the participant to notify the assessor if he/she experiences any pain or discomfort, especially around the spine. If notified, terminate the assessment.
- Instruct the participant to stand erect with knees straight.
- Adjust the chain so the upper (inside) edge of the bottom cross-member of the V-grip handlebar is at the top of the participant's patella (legs are straight). Verify this position.
- Instruct the participant to:
  - Flex at knees and hips until he/she can reach the handle.
  - Hold the bar and look straight ahead with neck in the neutral position.
  - Fully extend arms and maintain a straight (neutral) back.
- Ensure the participant maintains the following positions:
  - The hips are directly over the feet, with trunk and knees slightly bent.
  - The shoulders are "set" or retracted to ensure that the spine is neutral (cervical, thoracic and lumbar.)
  - The elbows are extended
- Advise the participant to "ease into" the isometric leg extension and release it slowly, without bending at the waist, flexing the arms, or jerking the hand.
- Instruct the participant to extend legs, using proper form and technique. Encourage the participant to limit the first trial to approximately 50% of maximal effort.
- Participant will apply — 50% force for a maximum of 3 seconds while exhaling.
- After 3 seconds, instruct the participant to slowly relax arms and legs, and to remain at a standing rest for 30 seconds. The device will record the peak force exerted.
- Once the participant has completed the 30-second recovery period, begin the 2<sup>nd</sup> trial.
- The participant should use maximum effort during the 2<sup>nd</sup> and 3<sup>rd</sup> trials.
- Record the two trials to the nearest kilogram.
- Record the highest trial.

Note: Digital readout will display the peak force ("p") and the average force ("a") achieved during the three evaluations.

## WFI VERTICAL JUMP — Optional Assessment LEG POWER ASSESSMENT

### Equipment:

- Pressure Mat - “Just Jump” Probotics
- Safety Tape - or any object that can be suspended above the mat to act as a target
- Calculator

Figure 5.17



Figure 5.18



### ASSESSMENT

- The purpose of this assessment is to estimate peak power produced in the lower body.
- Collect the participant’s body weight and record in kilograms (# lbs ÷ 2.2 = kg).
- Conduct pre-evaluation procedures.
- Place the jumping mat on a level surface. Connect the cord attached to the jumping mat to the handheld computer port.
- With the participant off the mat, turn the computer on. Choose “One Jump” on the computer menu. The display should read “Step on Mat”.
- Have the participant squat to a position where the knees are at a 90° angle and the hands by the sides (momentary pause @ 90°).
- Instruct the participant to jump straight up as high as he/she can, reaching toward the ceiling or a target object, without tucking the legs, and land with both feet on the mat.
- When the participant has completed the jump, the display will read the hang time and vertical jump in inches. The vertical jump mode resets automatically.
- Have the participant perform a series of 3 jumps and record the highest distance in inches.
- Convert the highest jump achieved in inches to centimeters (# inches × 2.54 = cm).
- Use the power formula provided below with the jump height (cm) and body weight (kg) to estimate leg power.

Any deviations from the above techniques cannot be counted, and the participant must repeat the trial.

The following are examples of situations that require a re-evaluation:

- The participant fails to land with both feet on the mat.
- The participant tucks the legs instead of extending them while jumping. Note: Administrators can minimize the tendency of participants to tuck the legs by suspending a target object above the mat for the participant to attempt to touch.

### Power formula:

$$\text{Leg Power (watts)} = [(60.7 \times \text{jump height (cm)}) + (45.3 \times \text{body weight (kg)})] - 2055$$

Use the following conversions:

Height in inches to centimeters (# inches × 2.54 = cm)

Body weight in pounds to kilograms (# lbs ÷ 2.2 = kg)

## WFI PRONE STATIC PLANK — CORE STABILIZATION ASSESSMENT

### Equipment:

- Stopwatch
- Exercise Mat

Figure 5.19



### ASSESSMENT:

The purpose of this assessment is to evaluate the muscular endurance of the core stabilizer muscles of the trunk.

- Conduct the pre-evaluation procedures.
- Instruct the participant to lay prone, keeping upper body elevated and supported by the elbows. Raise hips and legs off the floor, supporting the body on forearms and toes. Position elbows directly under the shoulders. Maintain straight body alignment from shoulder through hip, knee and ankle.
- The ankles should maintain a 90° angle, the scapulae should remain stabilized with elbows at 90°. The spine should remain in a neutral position throughout the assessment.
- Once the feet are in position, the participant then extends the knees, lifting off the floor. Start the stopwatch at this time.
- Instruct the participant to contract the abdominals so that the back will remain flat in the neutral position for the duration of the assessment.
- Any deviations from the above posture will warrant 2 verbal warnings. If a 3<sup>rd</sup> infraction occurs stop the watch and terminate the assessment.
- The assessor shall terminate the evaluation when the participant:
  - Reaches 4 minutes; or
  - Is unable to maintain proper form after the 2<sup>nd</sup> warning.
- Once the assessment termination criteria are met, stop the watch and record the time.

## WFI PUSH-UP

### Equipment

- Five inch prop (i.e. cup; sponge)
- Metronome
- Stopwatch

Figure 5.20



Figure 5.21



### ASSESSMENT

The purpose of this assessment is to evaluate muscular endurance of the upper body.

- Conduct Pre-Evaluation Procedures.
- Advise the participant that the evaluation is a series of push-ups performed in a 2-minute time period, for a maximum of 80 push-ups. The evaluation is initiated from the "up" position (hands are shoulder width apart, back is straight, and head is in neutral position).

### Advise the participant of the following:

- It is not permitted to prop feet against a wall or other stationary object.
- Back must be straight at all times (neutral position).
- Arms must be fully extended during the up-phase.
- Cadence with the metronome must be maintained, (one beat up and one beat down).
- Position the 5-inch prop on the ground beneath the participants chin.
- The metronome is set at a speed of 80 bpm, allowing for 40 push-ups per minute, and a maximum of 80 push-ups in 2 minutes.
- The participant must lower the body toward the floor until the chin touches the prop.

### The assessor shall terminate the evaluation when the participant:

- Reaches 80 push-ups;
- Performs 3 consecutive incorrect push-ups; or
- Fails to maintain continuous motion with the metronome cadence.
- Once the assessment is complete, record the highest number of successfully completed push-ups.

\* Participants with a history of shoulder and/or wrist injury that could be exacerbated by performing the conventional push-up protocol may perform the WFI alternate grip push-up evaluation.

## OPTIONAL ASSESSMENT: WFI ALTERNATE GRIP PUSH-UP TEST

### Equipment:

- Push-up handles
- Metronome
- Stopwatch
- Prop – 5", plus the height of the handles

Figure 5.22



Figure 5.23



### ASSESSMENT:

The purpose of this assessment is to evaluate muscular endurance of the upper body. The alternate grip push-up (with stands) is an optional assessment for participants who experience muscular/skeletal discomfort in the performance of the standard WFI push-up.

- Place the modified prop so that the chin of the participant will contact the prop during the lowering phase. (Prop height = 5" plus the height of stands).
  - Set the metronome at a speed of 80 bpm, allowing for 40 push-ups per minute for 2 minutes.
  - The assessor shall terminate the evaluation when the participant:
    - Reaches 80 push-ups;
    - Performs three consecutive incorrect push-ups; or
    - Fails to maintain continuous motion with the metronome cadence.
  - Once the assessment is complete, record the highest number of successfully completed push-ups.
- Conduct the pre-evaluation procedures.
  - Advise the participant that the evaluation is a series of push-ups performed in a 2-minute time period to complete a maximum of 80 push-ups. The evaluation is initiated from the "up" position (hands are shoulder width apart, back is straight, and head is in neutral position).
  - Advise the participant of the following:
    - It is not permitted to prop feet against a wall or other stationary object.
    - Back must be straight at all times (neutral position).
    - Arms must be fully extended during the up-phase.
    - Cadence with the metronome must be maintained, (one beat up and one beat down).
  - Instruct the participant to grasp the push up stands, and assume the "up" position. (Caution: hex dumbbells may roll)

## WFI FLEXIBILITY EVALUATION

### Equipment

- Novel Acuflex I or equivalent trunk flexibility test device

Figure 5.24



Figure 5.25



- The assessor then sets the guide to 0.0 inches at the tips of the middle fingers.
- Instruct the participant to exhale continuously while stretching slowly forward, bending at the waist, and pushing the measuring device with the middle fingers. The participant will maintain full extension of the legs, and shoulders flexed, and fingers in contact with the gauge throughout the stretch. The participant will momentarily hold the stretch at the endpoint.
- The participant will perform three trials, resting for 30 seconds between trials.
- Once the assessment is complete, record the greatest reach distance from among the three trials (rounded to the nearest 1/4 inch).
- The trial must be repeated if the participant bounces, flexes knees or uses momentum to increase distance.

### ASSESSMENT

The purpose of this assessment is to evaluate generalized flexibility of the shoulders, trunk, and hips.

- Conduct Pre-evaluation Procedures.
- Advise the participant that the evaluation is a series of 3 trials that evaluate the flexibility of the shoulders, trunk and hips.
- Advise the participant that the flexion required during this evaluation must be smooth and slow, as she advances the slide on the measuring device to the most distal position possible.
- Instruct the participant to sit on the floor ensuring the head, upper back, and lower back are in contact with the wall.
- The participant should then place legs together, fully extended.
- The administrator should position the sit-and-reach box flat against the feet.
- The participant should maintain head and upper/lower back in contact with the wall, scapulae retracted, while establishing arm length.
- Then, extend arms fully in front of the body with one hand over the other. (Check scapular retraction.)

**FITNESS EVALUATION  
EQUIPMENT MANUFACTURES**

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Jackson Strength Evaluation System  
Lafayette Instrument Company  
Phone: 800-428-7545 or 765-423-1505  
Website: [www.licmef.com](http://www.licmef.com)

JAMAR Hydraulic Hand Dynamometer  
Lafayette Instrument Company  
Phone: 800-428-7545 or 765-423-1505  
Website: [www.licmef.com](http://www.licmef.com)

Novel Acuflex II Trunk Flexibility Tester  
Novel Products, Inc.  
Phone: 800-323-5143  
E-mail: [www.novelprod@aol.com](mailto:www.novelprod@aol.com)

StairMaster StepMill 7000 PT  
Nautilus, Inc.  
Phone: 800-782-4799  
Website: [www.nautilus.com](http://www.nautilus.com)

Probotics "Just Jump" Mat  
Probotics, Inc.  
Phone: 256-489-9153  
Website: [www.probotics.org](http://www.probotics.org)

**Total Started Survey: 20**  
**Total Finished Survey: 20 (100%)**

PAGE: 1

1. What is the makeup of your department?

[Create Chart](#) [Download](#)

	Response Percent	Response Count
Career	55.0%	11
Volunteer	0.0%	0
Combination	40.0%	8
Part-time	5.0%	1

**answered question 20**

**skipped question 0**

2. Does your department require EMPLOYEES to pass an annual physical ability/agility test? If yes, please continue with survey.

[Create Chart](#) [Download](#)

	Response Percent	Response Count
Yes	30.0%	6
No	70.0%	14

**answered question 20**

**skipped question 0**

3. Who is required to take the ability/agility test? Please check all that apply:

[Create Chart](#) [Download](#)

		Response Percent	Response Count
<b>Firefighters</b>		100.0%	6
<b>Officers</b>		100.0%	6
<b>EMS personnel</b>		100.0%	6
<b>answered question</b>			<b>6</b>
<b>skipped question</b>			<b>14</b>

4. Does your department's test take into consideration a person's age or gender?

[Create Chart](#) [Download](#)

		Response Percent	Response Count
<b>Yes</b>		22.2%	2
<b>No</b>		77.8%	7
<b>answered question</b>			<b>9</b>
<b>skipped question</b>			<b>11</b>

5. Does your department's test include fire ground tasks?

[Create Chart](#) [Download](#)

		Response Percent	Response Count
<b>Yes</b>		50.0%	4
<b>No</b>		50.0%	4

**answered question** 8

**skipped question** 12

6. Is your department's test a timed test?

[Create Chart](#) [Download](#)

		Response Percent	Response Count
<b>Yes</b>		44.4%	4
<b>No</b>		55.6%	5

**answered question** 9

**skipped question** 11

7. If a person fails the test are there consequences or requirements they must meet in order to return to duty?

[Create Chart](#) [Download](#)

		Response Percent	Response Count
<b>Yes</b>		44.4%	4
<b>No</b>		55.6%	5

**Other (please specify)** 4  
[Show Responses](#)

**answered question** 9

**skipped question** 11

8. Are there rewards for a person who passes the test?

[Create Chart](#) [Download](#)

		Response Percent	Response Count
Yes		22.2%	2
No		77.8%	7
<b>answered question</b>			<b>9</b>
<b>skipped question</b>			<b>11</b>

9. If you answered "Yes" to Question 8 - Please check the kind of rewards that are received:

[Create Chart](#) [Download](#)

		Response Percent	Response Count
Monetary		50.0%	1
Comp Time		0.0%	0
Other incentives		50.0%	1
Other (please specify) <small>Show Responses</small>			1
<b>answered question</b>			<b>2</b>
<b>skipped question</b>			<b>18</b>

10. Does your department require an annual health physical?

[Create Chart](#) [Download](#)

Response Response

		Percent	Count
<b>Yes</b>		<b>52.9%</b>	<b>9</b>
<b>No</b>		<b>47.1%</b>	<b>8</b>
		<b>answered question</b>	<b>17</b>
		<b>skipped question</b>	<b>3</b>



## Policy and Procedure Manual

Section: 4.67

Title: Employee Health and Wellness

Page: 1 of 3

Date: 12/10 Reviewed: 07/11

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- 4.67.01 In accordance with the agreement with the I.A.F.F. Local 4010 the I.A.F.F./I.A.F.C. Labor Management Wellness and Fitness Initiative will be the standard for the improvement of the quality of life and safety of all employees both career and part time who are assigned to fire and emergency medical duties.
- 4.67.02 Effective January 1, 2011, all uniformed employees assigned to fire and emergency medical duties will be required to participate in a fitness program as outlined by this policy.
- 4.67.03 All employees covered under this policy shall be required to participate in some form of physical exercise for a period of not less than one hour during each assigned shift. For purpose of clarification, a shift shall be defined as any time an individual is on duty and being compensated by virtue of a regularly scheduled shift, assigned overtime, or trade.
- 4.67.04 Whenever possible personnel assigned to a medic unit shall be rotated to fire suppression duties to minimize an interruption from an emergency run.
- 4.67.05 To support this program, the Shift Supervisor shall provide ample opportunity for all on duty personnel to participate in some form of physical exercise and if necessary, units placed "out of service" during this time. If a unit is placed "out of service" it will be expected that all crew members will complete their program during this time.
- 4.67.06 Emergency units taken out of service to accommodate this program shall be placed back in service when multiple runs occur. For the purpose of clarification units placed out of service shall be considered "third out" during this time.



# Policy and Procedure Manual

Section: 4.67

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4.67.07 Employees shall be required to document their participation in this program and compliance with this policy by entering the appropriate information in the Journal located in the Firehouse software.

4.67.08 In an effort to insure that current employees maintain a reasonable level of physical fitness required to safely perform the duties associated with their position, all employees assigned to fire suppression and emergency medical services shall be required to complete the physical agility test in May of each year as outlined in Section 5.08 of the Policy and Procedure Manual.

4.67.09 If an employee fails to pass the physical agility test during their first attempt, it shall be the responsibility of the employee to initiate the steps necessary to improve their level of physical fitness which will enable them to perform the tasks associated with their position without danger to themselves and others.

**4.67.10** In accordance with this policy any employee who fails to complete the physical agility test, or if by observation, a noticeable physical deficiency exists and/or a medical problem is suspected that employee shall be referred for a medical evaluation upon approval of the Fire Chief.

**4.67.11** The requirement for existing employees to successfully complete the physical agility test on an annual basis shall be considered non-punitive for both the employee and the fire department. There is a reasonable expectation that an employee has an obligation to maintain a level of physical fitness necessary to safely perform the tasks associated with their position without jeopardizing their physical well being. In addition, there is a reasonable expectation that an employee will not place the fire department in a position of liability by expecting the fire department to allow them to continue to perform the duties of their position when they have not demonstrated their ability to do so, or have received written notification by a physician that they are not fit for duty.



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- 4.67.12 Medical evaluations for career personnel will be referred to the department's physician who conducted the annual physical examination and who had certified the employee "fit for duty".
- 4.67.13 Medical evaluations for part time personnel will be referred to their personal physician for medical examination and shall return a "fit for duty" letter signed by their physician.