

# **PHYSICAL FITNESS PREPARATION GUIDELINES AND PHYSICAL ABILITY TEST OVERVIEW FOR FIRE FIGHTER APPLICANTS**

**LOUISVILLE METRO CIVIL SERVICE  
AND  
LOUISVILLE FIRE & RESCUE**

Prepared by

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## INTRODUCTION

This manual is intended to help applicants prepare for the challenge of Fire Fighter physical ability screening procedures. Guidelines are provided so that the ambitious applicant can attain fitness levels required to pass physical screening tests. The training procedures apply to all individuals. Those in poor physical condition will experience rapid gains in fitness. However, a considerable time period may be required to improve fitness sufficiently to pass the tests. Individuals in reasonably good physical condition will improve less rapidly but will reach a higher level of fitness and therefore be better prepared. Regardless of the current state of fitness, training should be employed prior to testing if possible. Training will emphasize cardio-respiratory (heart-lung) fitness, flexibility, overall strength and muscular endurance with special emphasis on upper body, arm and shoulder strength. Weight training and running programs are presented.

It is especially important that females prepare for the screening tests. Females generally possess a smaller frame and musculature than males and less over-all strength and fitness. Test items requiring upper body and especially arm and shoulder strength pose the greatest challenge to females. This challenge can, in many cases, be overcome through diligent training. Females need not fear becoming muscle bound when training with weights. Because of hormonal differences between males and females, females will become stronger through weight training, but will not develop large bulky muscles. Cardio-respiratory exercises such as running will affect males and females in the same manner.

It must be emphasized that following these guidelines is no guarantee for passing the tests. However, the chances of passing will be greatly increased if potential test items are familiar and adequate preparatory training has taken place.

TO: FIRE FIGHTER APPLICANTS

FROM: Dr. Bryant A. Stamford, Director  
Health Promotion Center, University of Louisville

Several years ago, I prepared a manual to help applicants prepare for the physical demands of the Fire Fighter physical ability test. Fire Fighting presents an extremely demanding physical challenge and only those who can adequately cope with this challenge will be admitted to recruit training. Preparatory training as detailed in this manual will enhance your chances of passing the test.

In recent years, females have applied as Fire Fighters in increasing numbers. I believe I speak for Louisville Fire & Rescue and the Louisville Metro Civil Service, as well as myself, when I say that females are strongly encouraged to pursue the career of Fire Fighter. In order to do so successfully, females and males must invest time and effort in increasing their strength and endurance. Because females tend to possess less upper body strength than males, it is likely that females will require intensive training to overcome these natural obstacles. Please note, females are not required to demonstrate the same level of strength and fitness as well trained males. They are required, however, to meet minimal standards.

The Kentucky Commission on Human Rights has challenged several statements in the manual. Specifically, it is perceived that the manual contains “references which overtly discourage women”. I apologize for this perception and I assure you that my intention was quite the contrary. It was my intention to emphasize the fact that females will, in general, require intensive effort in physical preparation in order to overcome the natural obstacles mentioned earlier. Moreover, it was my intention to encourage females to approach their training with intensity and zeal with the result that more females would qualify.

As an act of good faith, two services are provided to all applicants well in advance of testing. First, the manual will be made available immediately to those who apply. In this way, physical training can, and should start immediately. Second, several days will be set aside for applicants to visit the Fire Fighter Training Academy for the purpose of learning how to perform the various tests. This will also serve the purpose of self-testing to determine progress and to assess what needs to be improved upon prior to the actual test.

I urge all applicants to maximize their efforts every available day prior to testing. Good luck to each of you.

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## CHAPTER I

### **WHY CHALLENGING PHYSICAL SCREENING PROCEDURES ARE NECESSARY FOR FIRE FIGHTING**

Fire Fighting involves extremely hard and skillful physical work as well as the understanding of how to cope with emergency situations. For example, consider the following circumstances. A four-story building is on fire. The Fire Fighter rushes upstairs to the fourth floor carrying hosing or other heavy equipment weighing from 60 to 100 pounds. Upon reaching the fourth floor, a cry for help is heard; but, flames block the door. The Fire Fighter must quickly ax through the wall to rescue the victim. When finally reached, the victim is unconscious and must be carried outside to safety. This accomplished, the Fire Fighter must re-enter the building and battle the fire. This level of physical activity would exhaust the average person very quickly. Therefore, it is obvious that in order for Fire Fighters to be effective they must be physically fit and resistant to fatigue. Furthermore, Fire Fighter applicants must demonstrate the ability to cope with intense physical demands as evidenced by performance on a physical screening test battery.

Screening procedures for Fire Fighter applicants must be viewed as not only a method for selecting the best employee, but also as a safeguard for the applicant. If screening tests were not applied, individuals who could not physically perform the job might be placed in a situation best characterized as “survival of the fittest”. This would result in large employee turnover and an increased risk of injury disability. Although a high level of physical fitness is not necessarily a fail-safe approach to avoiding disability, the probability is certainly lessened. Therefore, physical fitness requirements are critical to the employment process and cannot be in any way compromised.

The demands of fire fighting are such that physical standards cannot be manipulated to enable more women to qualify. A better solution is for women to increase their strength and stamina through training to prepare for potential demands. Admittedly, not all conscientious females who train hard will qualify. This of course applies to males as well. Training is not a guarantee of success. The harder and longer you train, however, the greater your probability of success.

## CHAPTER II

### **PHYSICAL CHARACTERISTICS REQUIRED FOR FIRE FIGHTERS**

The physical characteristics required for performing the job of fire fighting are:

- I. Cardio-Respiratory (heart-lung) Fitness
- II. Appropriate Body Composition
- III. Strength and Muscular Endurance
- IV. Flexibility

It is essential that individuals seeking employment as Fire Fighters possess these characteristics because the potential demands of the occupation are not only great, but may be life-threatening. Fire Fighters work in a hostile environment and must be physically prepared for the demands of the job.

The following is a brief description of each of the physical characteristics the would-be Fire Fighter must possess.

#### CARDIO-RESPIRATORY (HEART-LUNG) FITNESS

The ability to perform prolonged physical work is directly dependent upon how well the body delivers oxygen to the working muscles. Oxygen is delivered to the muscles and other body tissues by the blood, which is pumped and circulated by the heart. If the heart cannot pump sufficient quantities of blood, oxygen will not arrive at the needed locations. A diseased or poorly fit heart will pump small amounts of blood per beat which in turn requires the heart to beat very rapidly in order to compensate for its poor pumping power. This places a great stress on the heart. In addition, the poorly fit individual will not have a sufficient oxygen supply to the muscles. He/she will fatigue very quickly and be forced to stop working. A highly fit individual will have a large oxygen supply to the muscles and will be capable of prolonged muscular exercise. A measure of cardio-respiratory fitness is the maximal amount of oxygen that can be consumed per minute, or “aerobic power”.

A fit individual can sustain 50% of his/her aerobic power for one hour before becoming exhausted. Tasks requiring greater effort will result in exhaustion in a shorter period of time.

A highly trained physically fit individual will be capable of performing more work over a longer period of time than the untrained individual. For example, an untrained male may possess an aerobic power of 3.0 liters of oxygen per minute, which equates to a maximal energy expenditure of 15 calories per minute. A task such as chopping with an ax requiring 7.5 calories per minute would represent 50% of the maximal caloric expenditure of 15 calories, which in turn would result in exhaustion in approximately one hour. The highly trained male, on the other hand, with an aerobic power of 5.0 liters of oxygen per minute would be capable of performing the ax-chopping task for a considerably longer period of time. The caloric equivalent of 5.0 liters per minute of oxygen is 25 calories. The 7.5 calories per minute required for ax chopping represents only 30% of the maximal caloric expenditure for this individual. A task requiring only 30% of maximal ability can be sustained for several hours without exhaustion.

The ability to deliver oxygen can be enhanced through physical training. The heart is a muscle and as such, responds to daily physical exercise by getting bigger and stronger. As the heart is strengthened, more blood is circulated per minute and more oxygen, as well. There are also changes in the muscles. They become more efficient and capable of extracting and utilizing greater amounts of oxygen from the blood. The number of blood vessels is increased resulting in better pathways for delivery of oxygen. Greater oxygen delivery contributes to greater work output and thus a more efficient Fire Fighter. The efficient Fire Fighter is not as likely to experience a heart attack. From the standpoint of health and the use of exercise as preventive medicine, there is significant medical evidence that a strong and physically fit heart is less susceptible to heart disease. The fit heart has well-developed blood vessels which feed the heart muscle itself with oxygen and nutrients. When these vessels “clog up”, less blood is delivered to the heart muscle. Furthermore, “clogged” heart arteries increase the possibility that a blood clot may arrive and completely close the artery leading to a heart attack. Healthy arteries, enlarged through physical exercise, are less likely to clog. If a heart attack should occur, the physically fit heart will be damaged less severely than an unfit heart. The probability of sudden death from heart attack is also reduced in the physically fit person.

## BODY COMPOSITION

A Fire Fighter should possess primarily muscle and very little body fat. An excess accumulation of body fat is undesirable for a variety of reasons. From a health standpoint, medical problems exist in which obesity or “over fatness” is considered a risk factor. These problems include coronary heart disease, high blood pressure, impaired carbohydrate and fat metabolism, joint, bone, and gall bladder diseases, asthma and various lung disorders. From a physical performance standpoint, excess fat is like carrying

dead weight and can only hinder physical performance. Since fire fighting requires a near maximal effort from the heart and other muscles, additional fat weight adds an extra burden to the cardiovascular system and thus the over fat Fire Fighter puts himself/herself in a potentially dangerous situation when fighting fires.

Weight loss in the form of body fat is necessary in order to achieve appropriate body composition and this should be achieved by both diet and exercise. A combination of diet and exercise is more effective than either separately. In order to lose one pound of fat, a net loss of 500 calories per day will total one pound of fat loss per week. Weight can be lost more quickly than this; however, much of the loss will be water and muscle tissue. A net loss of 500 calories per day can be achieved easily through dieting. Merely subtract several food items that add up to 500 calories from the diet. It is beneficial to perform exercise such as jogging in combination with the diet. On the average, 120 and 80 calories per mile jogged will be expended for males and females, respectively. When combined with the dietary loss of 500 calories, a two-mile daily jog could result in a loss of one pound of fat in five days.

### STRENGTH AND MUSCULAR ENDURANCE

Strength can be defined as the ability to apply force. Since nearly all movements are performed against some resistance, a certain degree of muscular strength is needed to perform any activity. Fire Fighters perform activities against much greater resistance than the average individual. Therefore, the Fire Fighter must necessarily have above average strength and muscular endurance.

Freehand callisthenic exercises such as push-ups and pull-ups will increase strength to a degree. However, the body will quickly adjust to the demands of these exercises without further increases in strength. In order for strength to increase, the resistance against which muscles work must continuously be increased. Weight training with barbells offers this possibility. Resistance machines are also excellent for increasing strength.

Weight training is critical for females because of the need for increased upper body strength, especially in the arms and shoulders. Female basketball players have been using weight-training techniques in recent years, which have resulted in the ability of women to shoot longer distances more accurately than they could years ago. The hormonal differences between males and females dictate very different responses to weight training. Females will become stronger, but will not develop large bulky muscles similar to males. Their potential and rate of improvement is lower than that for males.

## FLEXIBILITY

As individuals age, they lose flexibility in their joints. Lack of flexibility is a primary cause of improper movement, which can lead to serious injury. One of the areas most susceptible to injury when handling weight (as in fire fighting) is the lower back. Many people lose considerable time at work, suffer chronic discomfort and spend large amounts of money in an attempt to alleviate the pain caused by lower back strain. Most experts believe that important factors contributing to lower back injury are weak abdominal muscles and poor joint flexibility in the back and legs. Since fire fighting can contribute to lower back injury, it is advantageous to maintain strength and flexibility to these areas through weight training and stretching exercises.

The degree of flexibility in joints is dependent on both structural and functional components. Structural components cannot be changed. For example, the hip joint is not capable of the range of movement of the shoulder joint because of structural differences. Such structural differences may exist throughout the general population. Functional limitations, however, are a product of use and exercise.

## CHAPTER III

### PHYSICAL ABILITY TEST OVERVIEW

Each candidate must complete tasks 1, 2, 3 and 4 successfully, within the required guidelines, prior to attempting Tasks 5 through 10.

#### **TASK 1/STATION 1:**

**LADDER DRAW:** Candidate removes an 18' straight beam ladder weighing 52 pounds from brackets attached to a wall (same height as on an apparatus). The ladder is placed on the ground, and then returned to the starting position on the brackets. This simulates getting a ladder off an apparatus.

**REQUIREMENT:**      **TIME LIMIT:**      **20 Seconds**

Failure to complete this task or failure to complete this task within the required time limit constitutes a failing grade on the overall test battery.

#### **TASK 2/STATION 2:**

**LADDER RAISE:** Starting from the ground, one end of a 28-foot, 100-pound ladder is pressed overhead to arms length while the other end is anchored to the ground. In a hand-over-hand motion, the candidate walks toward the anchored end grasping **every** consecutive rung in an effort to raise the ladder. The task is completed when the ladder is held against the wall opposite the starting position. Candidates are to brace the ladder against the wall until a spotter has secured it. The spotter and the candidate will then lower the ladder to the ground. This simulates raising a ladder on the side of a building.

**REQUIREMENT:**      **TIME LIMIT:**      **16 Seconds**

Failure to complete this task or failure to complete this task within the required time limit constitutes a failing grade on the overall test battery.

**TASK 3/STATION 3:**

**LADDER HOIST:**

A two-splice ladder weighing approximately 265 pounds is secured to a wall by one section. A moveable section is elevated to full extension by pulling on an attached rope using a hand-over-hand motion. Once the ladder is fully extended, time is stopped. The candidate must then lower the ladder using the same hand-over-hand method. This simulates hoisting a two-splice or three-splice ladder to gain access to a window.

**REQUIREMENT:**

**TIME LIMIT: PASS/FAIL However, time will be kept and reported to the Fire Division.**

Failure to complete this task constitutes a failing grade on the overall test battery.

**TASK 4/STATION 4:**

**HOSE CONNECTION:**

At the beginning of the test, there will be a wrench, a reducer, a 5" hose, and a 3" hose laid out next to a hydrant. The candidate must pick up the wrench, place it on a cap, and remove the cap. The other cap will then be removed in the same manner. The applicant will then set down the wrench and put the reducer on the left (facing west) side of the hydrant. The candidate must then connect the 3" hose to the reducer. The 5" hose will then be attached to the right side of the hydrant. The 5" hose, reducer, and 3" hose must all be hand tightened. The candidate will then pick up the wrench, place it on the valve on top of the hydrant, and turn the valve four times, thus simulating turning on the water. The candidate will then reverse this procedure, closing the valve, removing the 3" hose, reducer, and 5" hose, and then putting the caps back on the hydrant. Timing will begin when the candidate touches the wrench used to remove the caps and stop when the candidate finishes putting the caps back on the hydrant.

Candidates will see a demonstration of the above procedure performed twice by Fire Department spotters prior to performing this task.

**REQUIREMENT:**

**TIME LIMIT: 1 Minute & 50 seconds**

Tasks 5 through 10 are to be completed consecutively in sequential order. A candidate's time will start once he/she crosses the starting line at Station No. 5 and will not stop until he/she has crossed through the stairwell doorway at Station 10.

**TASK 5/STATION 5:**

**STAIR CLIMB WITH HOSE:** Candidate advances through the door of the Fire Tower stairwell with a hose bundle weighing approximately 60 pounds and climbs 7 flights of stairs to a designated area. Once the appointed area has been reached, the candidate rings a bell and returns to ground level with the hose bundle, drops it and proceeds to Task 6/Station 6. This simulates climbing steps to get to the fire floor.

**TASK 6/STATION 6:**

**HOSE CARRY:** Candidate is required to remove a bundle of hose weighing approximately 80 pounds from a simulated hose rack (same height as on an apparatus) and zigzag up and back through 100 feet of cones spaced 5 feet apart. Once back at the simulated hose rack, the candidate places the bundle of hose on the ground in front of the hose rack. Once the candidate has completed this task, he/she proceeds to Task 7/Station 7. This simulates carrying hose bundles around obstacles at a fire scene.

**TASK 7/STATION 7:**

**FIRE ESCAPE  
ASCENT/DESCENT:** Candidate climbs up a fire escape (the fire escape is at the same pitch as the stairs) to the fifth floor, touches the door, then descends the fire escape and proceeds to Task 8/Station 8. This simulates climbing a fire escape to get to the fire floor.

**TASK 8/STATION 8:**

**HOSE CARRY:** Candidate repeats Task 6/Station 6. Upon completion, candidate proceeds to Task 9/Station 9. Repeating this event is included to measure the endurance required at fire scenes.

**TASK 9/STATION 9:**  
FIRE ESCAPE  
ASCENT DESCENT:

Candidate repeats Task 7/Station 7. Upon completion, candidate proceeds to Task 10/Station 10. Repeating this event is included to measure the endurance required at fire scenes.

**TASK 10/STATION 10:**  
STAIR CLIMB  
WITHOUT HOSE:

Candidate advances through the door of the Fire Tower stairwell, runs up the stairs to the seventh floor, rings a bell and returns to the starting position. This event is repeated to measure endurance required at fire scenes. This simulates climbing steps to get to a fire floor.

**NOTE:** Once the candidate crosses through the stairwell doorway, his/her time is stopped and the physical ability test is completed.

**TIME LIMIT: 11 Minutes**

**NOTE:** If a candidate fails to complete a task or fails to complete Tasks 5 through 10 in the required time limit, the candidate fails the overall test battery.

## CHAPTER IV

### TRAINING PROGRAM

Two levels of training intensity are outlined. Individuals presently engaged in regular physical exercise, or who have been highly trained in the recent past, should be capable of high intensity training. Individuals with little or no training experience should train at the lower level intensity level for at least six weeks before progressing to the higher intensity level.

The following factors are critical for successful training:

- 1) Regardless of conditioning level, a complete physical examination by your personal physician before beginning these programs is recommended.
- 2) Running shoes are extremely important in order to avoid injury to the feet, ankles and knee joints.
- 3) Precede every training with several minutes of warm-up exercises. A suggested list is presented on page 13.
- 4) Follow every training session with the same warm-up exercises. This will help promote flexibility and avoid injury.
- 5) Respect your body. If you do have pain because of the exercise program, you are doing too much too soon.

The following tests should be performed to determine the appropriate level for initiating training. **FIRST:** Find an outdoor track, or measure a distance that is 1-1/2 miles long. Attempt to run or walk-run this distance in 12 minutes and 37 seconds or less. If the distance can be comfortably covered in 12 minutes, 37 seconds or less, a passing grade is earned. **SECOND:** Perform 6 pull-ups and 20 push-ups in perfectly strict fashion as follows: the pull-up starts with the elbows fully extended while hanging from the bar with palms facing away from the body. The chin is pulled above the bar by bending the elbows; then, the body is slowly lowered to starting position before attempting another pull-up. Push-ups require a perfectly straight back, touching the chest to the floor and returning to the starting position with elbows fully extended. When this is accomplished, a passing grade is earned.

If both tests are passed, proceed with high-level training. If the first test is passed and not the second, perform the higher level running program and the lower level weight-training program. The reverse situation would apply if the second test was passed and not the first.

## A. LOWER LEVEL TRAINING

The purpose of beginning training at a lower intensity level is to avoid strain and injury. Remember, if an injury should occur, it may interfere with the ability to adequately perform the required screening test items, which would ultimately defeat the purpose of this program.

### Aerobic Power

Begin by walk-jogging one mile at least three days per week. Walk 50 paces, then jog 100 paces alternately for one mile. During the second week, walk 50 paces, jog 200 paces for 1-1/2 miles. Starting in the third week, comfortably jog 1-1/2 miles. During weeks 4, 5 and 6, begin timing this 1-1/2 mile jog and attempt to reduce the time by several seconds each day. Set your goal for 12 minutes and 37 seconds or less. Once this goal is achieved, begin the higher-level training. This should be accomplished by the seventh week of training.

### Strength and Muscular Endurance

The only way to increase the strength of a muscle is to overload it and make it gradually perform more work. The key is “gradual”. There is an advantage to using barbells because increases in resistance are progressive and small. Increasing the resistance too quickly may result in injury. In addition, if the weight or resistance is too great, it will be difficult to perform the movement in a strict manner. Strict performance of each exercise will help avoid injury and ensure that the appropriate muscles increase in strength. Perform weight-training exercises three days per week either Monday, Wednesday and Friday or Tuesday, Thursday and Saturday. Weight training exercises may be performed on non-running days or before or after the running if you intend to run every day. Choose whichever feels most comfortable.

The following exercises (see pages 14 – 19) were chosen because they will strengthen major muscle groups with special emphasis on the arms and shoulders and because they can be performed without the aid of a training partner. Furthermore, all exercises are performed with an inexpensive barbell, which can be purchased at a sporting goods store. Such equipment is also available at YMCA’s and health clubs. An alternative to purchasing a barbell or joining a health club is constructing a set of barbells from pipes and cement filled cans. Use cans of various sizes for different weights. When beginning a weight training program, the starting weight for each exercise is an important consideration. Begin by performing 10 repetitions of each exercise as described. The term

“repetition” means one complete movement. A group of repetitions (for example, 10 complete movements) is called a set. The number of repetitions per set may vary. The present program, however, is designed with 10 repetitions per set as a goal.

Your first attempt at 10 repetitions should be with a very lightweight or even empty barbell. Following this first set of 10 repetitions, rest for approximately two minutes. Now add 5-10 pounds to the bar and again perform 10 repetitions. When the final two repetitions of the set, or in other words, when repetitions 9 and 10 are difficult to complete, this is the appropriate starting weight. Exercise with this weight three days per week. When the final repetitions are no longer challenging, add 5 pounds. Adding more weight to the barbell will be easy at first. After a while, gains will still occur but much less rapidly. The amount of weight used will vary among exercises. The larger muscle groups will require greater resistance and therefore more weight will be needed. Follow the described procedure for finding the appropriate starting weight for each exercise.

Each of the following exercises should be performed for two sets of 10 repetitions each. The first set is a warm-up and the amount of weight used should be approximately 50% of the actual workout weight used in the second set. For example, if 50 pounds is the weight used for the second set (remember, the final repetitions are to be challenging) then 25 pounds will be used for the warm-up. Individuals in the lower intensity-training category should limit themselves to these two sets.

## B. HIGH LEVEL TRAINING

It is assumed that individuals attempting the higher-level training have prior weight training and/or running experience. As indicated, if you can comfortably run 1-1/2 miles in 12 minutes and 37 seconds or less and perform 6 pull-ups and 20 push-ups in perfectly strict form, you are prepared for the higher level running and weight training programs, respectively.

### Strength and Muscular Endurance

Because exercise is quite intensive in the higher-level training, it may be advantageous to alternate running and weight training workouts. As such, weight training can be performed on Monday, Wednesday and Friday and running can be performed on the remaining days of the week. The higher-level weight-training program differs from the lower level training by adding two sets of repetitions. The first set is the same as before or, in other words, performed with 50% of the actual workout weight and represents a warm-up set. On the next three sets, it will be difficult to achieve the full 10 repetitions

per set. At the beginning, it may be possible to achieve only 10, 8 and 7 repetitions on the three sets, respectively. In this case, only add weight to the bar when all three sets can be performed for 10 repetitions each. If you have not progressed through the lower level training, review the previous section for more detailed guidance.

### Aerobic Power

Aerobic power training includes continuous and interval training. Perform continuous training on Tuesday and Saturday. Start with the 1-1/2 mile run and gradually increase the distance by adding 1/4 mile every week to a total of 3 miles. Once 3 miles are reached, gradually lower the time to completion. A high level of fitness is achieved when 3 miles are covered in less than 24 minutes.

Interval training will be performed on Thursday and Sunday. On Thursday, alternately run 1/4 mile and walk 1/4 mile. The run should be all out and will be exhausting. Start with two runs alternated with two walks. Gradually add additional 1/4 mile runs at the rate of one every week up to a total of six alternating runs and walks. On Sunday, alternately run 1/2 mile and walk 1/4 mile. The 1/2 mile run should be paced at a rate of approximately 10 mph, if possible, or 3 minutes per 1/2 mile. Start with two and add one 1/2 mile run every week to a total of four runs.

Occasionally substitute a sprint workout as follows: sprint 100 yards then walk 100 yards. Each sprint should be as fast as possible. Start with six sprints and gradually add one sprint every workout to a total of twelve sprints.

This training regiment is very demanding. Therefore, adequate sleep and good nutrition are mandatory. Because of the demanding nature of training, be careful not to over-train. If a chronic feeling of fatigue develops, take two days off and rest completely before beginning again. Also, rest two full days prior to reporting for physical fitness screening. Some training days will feel easy and others hard. Learn to push harder on the days when you feel energetic. Oftentimes, an additional day of rest will be very beneficial to overall progress. Avoid late hours because this will interfere with recuperation from a difficult workout. If you choose to diet, avoid fad diets that result in rapid weight loss. Rather, maintain a well balanced diet with smaller portions. You will require adequate nutrients in order to maximize the effects of this demanding training.

**ALWAYS PERFORM THE VARIETY OF FLEXIBILITY EXERCISES BEFORE AND AFTER EVERY WEIGHT TRAINING AND RUNNING WORKOUT.**

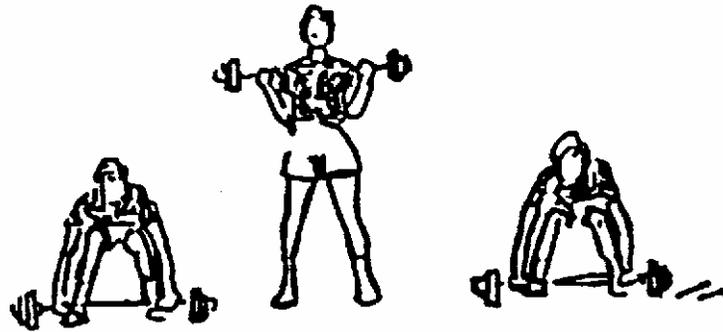
## FLEXIBILITY/WARM-UP EXERCISES\*

### EXERCISE

<b>NECK ROTATION</b>	Stand erect and move the head in large circles. Exercise the neck through the full range of motion.	10 (Left and Right)
<b>SHOULDER ROTATION</b>	Stand erect and extend the arms out to the sides and perform gradually larger circles with the arms.	10 (Front and Back)
<b>TRUNK ROTATION</b>	Stand erect and place feet at shoulder width apart and place hands on hips. Slowly rotate the trunk by bending forward, then to the right, to the rear, to the left and forward again.	10 (Left and Right)
<b>TOE TOUCH</b>	Stand erect, place feet together and lock the knee joints so the legs are perfectly straight. Slowly bend forward and touch the toes. Hold this position for 5 seconds and return to the starting position. Do not bounce during the movement. If the toes cannot be reached, bend as far forward as possible and hold. Gradually, as flexibility increases, the toes will be reached.	10
<b>RISE ON TOES</b>	Stand erect with knees locked and rise up on the balls of the feet as if performing a ballet movement. Lower until the heels touch the ground and repeat 25 times.	25

\*To be performed BEFORE and AFTER every training session. Other flexibility exercises can be included for variety. Remember to always stretch slowly – NEVER BOUNCE.

C. WEIGHT – TRAINING AND SELF-MONITORING FORMS



Exercise #1 CLEAN – Cleaning the bar entails moving it in one smooth motion from the floor to the shoulders as indicated in the accompanying pictures. From the shoulders, the bar is lowered to the starting position. Do not rest the bar on the floor between repetitions. Rather, lower it only to mid-calf level or several inches above the floor and then again clean to the shoulders. The motion should be smooth and the bar should not stop on its course from floor to shoulders. Note that in the starting position, the knees are flexed, the back is straight and not rounded, the head is up, and the over grip (or palms facing the body) is used. This position is important to avoiding straining the back. This exercise will strengthen most of the major muscle groups of the body including the legs, lower and upper back, and arms. For variety, the dead lift can be substituted for the clean. From the same starting position as described, the barbell is moved with arms held straight (not bent at the elbows) until reaching a standing position. When the movement is completed, the bar is held at arms length, the shoulders are squared as if standing at attention and the knees are straightened. Slowly lower the bar by bending at the knees until it touches the floor and repeat. You will be able to use considerably more weight on this exercise than the clean. Always perform this exercise slowly and with the knees bent. If the knees are not bent at the beginning and throughout, too much strain will be imposed on the lower back.

LOWER LEVEL

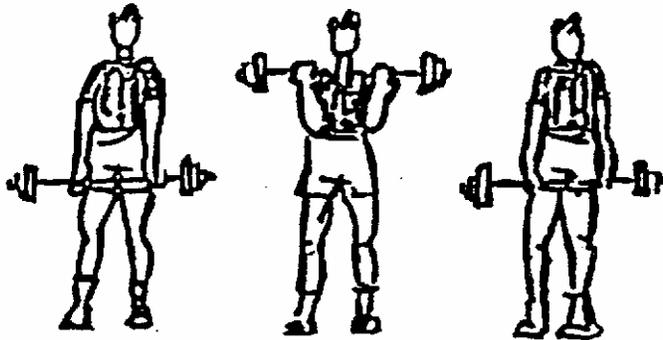
WEIGHT

Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set

HIGHER LEVEL

WEIGHT

Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set



Exercise #2 CURL – When picking up the barbell, always bend at the knees and keep the back straight. Lift with the legs to the starting position described in the accompanying pictures. Stand erect with the knees locked and feet shoulder width apart. Grasp the bar with palms facing away from the body. Keep the back straight without bending forward throughout the entire movement. Bend arms by flexing at the elbow joint and raise the bar to chest level. Return slowly to starting position. Never let the bar drop back to starting position, always lower slowly. This will help avoid injury and will increase strength. This exercise will develop the bicep muscles on the front of the upper arms. Avoid the temptation to cheat by swinging the bar. You may handle more weight by cheating; but, the effectiveness of the exercise will be reduced.

LOWER LEVEL

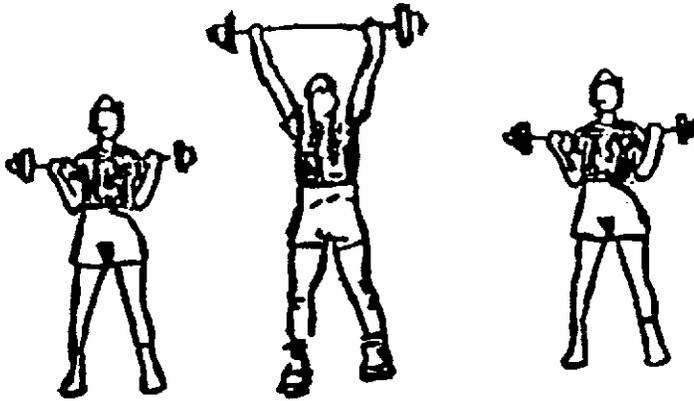
WEIGHT

Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set

HIGHER LEVEL

WEIGHT

Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set



Exercise #3 – OVERHEAD PRESS – Clean the bar to the shoulders as described previously. This is the starting position. Lock the knee joints and keep the back perfectly straight. Press the bar overhead and lock out the elbows. Focus the eyes on an object or spot on the wall at the level just above the top of the head. Lower the bar to the shoulders and repeat. When finished, slowly return the bar to the floor. This exercise will develop the shoulder and arm muscles.

LOWER LEVEL

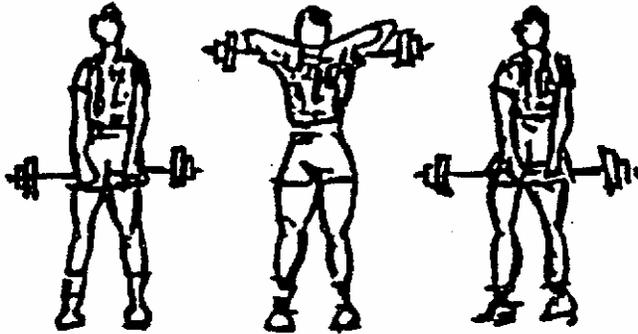
WEIGHT

Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set

HIGHER LEVEL

WEIGHT

Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set



Exercise #4 UPRIGHT ROWING – Stand erect with knees locked and back perfectly straight. Grasp the bar with palms facing the body about six inches apart. Bend at the elbow and raise the bar to neck level. Slowly lower the bar to starting position and repeat. This exercise will develop the shoulder and upper arm muscles.

LOWER LEVEL

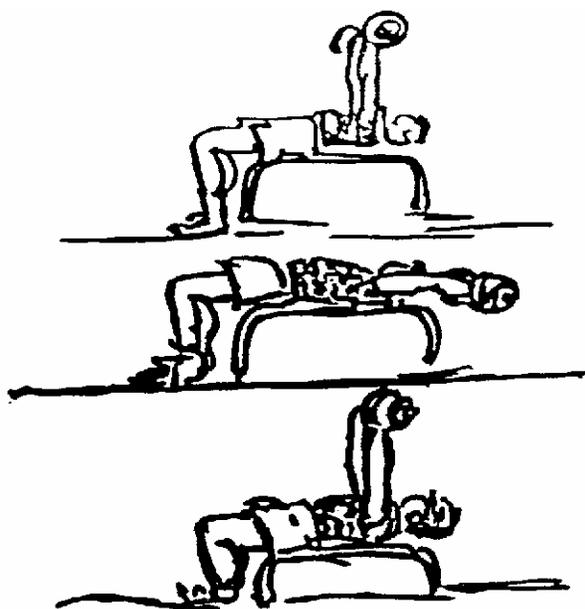
WEIGHT

Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set

HIGHER LEVEL

WEIGHT

Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set



Exercise #5 PULLOVER – This exercise can be performed on a bench as illustrated, or on the floor if a bench is not available. In order to assume the starting position, clean the barbell to the shoulders using the over-grip (see page 14) and sit on the bench. Slowly recline to a lying position. With elbows very slightly bent and the arms extended above the chest, slowly lower the bar until the arms are parallel to the floor. Never lower the bar beyond this point. Pull the bar back to starting position with arms extended above the chest. When finished, bend the elbows and lower the bar to the chest and then the floor. When performing this exercise on the floor, bend the elbows and pull the weight over the head to starting position. Lower the bar until it touches the floor and return to starting position. This exercise is very difficult to perform and therefore only lightweights will be used. Because of this, assuming either starting position will not be difficult. When determining the beginning weight, it is recommended to experiment initially with the empty bar. If this feels uncomfortably heavy, do not include this exercise until prepared for the higher intensity training level. This exercise will develop the muscles of the chest, upper back and arms.

LOWER LEVEL

WEIGHT

Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set

HIGHER LEVEL

WEIGHT

Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set
Date	1 <sup>st</sup> Set	2 <sup>nd</sup> Set



Exercise #6 – SIT-UP – Assume a lying position on the floor with knees bent. Anchor the feet under the bar or under an immovable object such as a chest of drawers or other furniture. Place hands behind the head. Do not use the arms to help pull the trunk forward. Slowly curl the trunk forward by consciously flexing the abdominal muscles. Slowly lower to the starting position. Avoid bouncing off the floor by stopping body movement for one second before beginning the next repetition. Perform 10 repetitions initially and add one repetition each workout to a total of 25. When 25 sit ups are no longer challenging, place a barbell plate of 5 pounds behind the head held between the hands. Gradually add weight when necessary.

**WEIGHT**

DATE \_\_\_\_\_ 10 repetitions

DATE \_\_\_\_\_ 25 repetitions

DATE \_\_\_\_\_ 25 repetitions

\_\_\_\_\_

Upon completion of the weight-training workout, additional exercises may be performed. If a chinning bar is available, perform as many pull-ups as possible. Begin by hanging from the bar with palms facing away from the body. Pull the body upward until the chin is over the bar. Lower the body slowly until the elbows are completely extended. Record total number performed periodically (e.g. monthly) in order to determine progress.

DATE _____	# of pull-ups	_____
DATE _____	# of pull-ups	_____
DATE _____	# of pull-ups	_____
DATE _____	# of pull-ups	_____
DATE _____	# of pull-ups	_____

If no pull-ups can be completed, keep trying. Hang from the bar as described and pull up as far as possible. The weight training exercises should increase strength sufficiently so that several pull-ups are possible.

Push-ups are also recommended. Lying face down, extend the arms completely from the chest level with the bodyweight supported on the hands and toes. This is the starting position. Lower slowly until the chest and chin touch the floor and return to starting position. If no push-ups can be completed, use modified push-ups with the bodyweight supported on the hands and knees. Eventually, regular push-ups will be possible.

DATE _____	# of push-ups	_____
DATE _____	# of push-ups	_____
DATE _____	# of push-ups	_____
DATE _____	# of push-ups	_____
DATE _____	# of push-ups	_____