

# CANDIDATE PREPARATION GUIDE

The job of a firefighter is one of the most physically demanding jobs in North America requiring high levels of cardiopulmonary endurance, muscular strength, and muscular endurance. The Candidate Physical Ability/Agility Test consists of ten critical physical tasks that simulate actual job duties on the fireground. This test is physically demanding and requires that you be physically fit to be successful. This guide was developed to assist you with physically preparing yourself for the test.

## **What is physical fitness in the fire service?**

Physical fitness is the ability to perform physical activities, such as fireground tasks, with enough reserve for emergency situations and to enjoy normal activities when off duty.

## **What are the major areas of fitness?**

The major areas of physical fitness include:

- flexibility
- cardiopulmonary endurance
- muscular strength
- muscular endurance

Body composition is also considered an area of physical fitness. Excess body fat increases the workload placed upon the body and decreases the body's ability to dissipate heat.

A proper physical fitness program should be specific to the job of a firefighter. It should include all of the major areas of physical fitness mentioned above and be a total-body program. This guide includes exercises which can be incorporated into a total-body fitness program.

**If you are not familiar with physical fitness programs, have any joint pain, or feel uncomfortable when you exercise, you should seek the advice of your personal physician or a professional trainer.**

## **HYDRATION**

Proper hydration is critical. All candidates should drink water before, during, and after exercise.

## **WARM-UP, COOL-DOWN, & FLEXIBILITY**

A warm-up serves several functions, including:

- increase blood flow to working muscles and joints
- decrease likelihood of injury
- decrease in pre-event tension
- possibly improve performance
- improve flexibility

A proper warm-up should begin with 5 – 10 minutes of the same type of activity you are about to do, but at a very light exertion level. For example, if you are preparing to go running, you should run for a short distance at a very easy pace.

Some of the functions a cool-down serves are:

- allow the body to gradually slow down to a resting rate
- decrease post-exercise muscle soreness
- allow the blood in the muscles and joints to return to central circulation
- improve flexibility

A proper cool-down should begin with 5 – 10 minutes of the same type of activity that you have just done, but at a very light exertion level. Oftentimes, the activity performed during the cool-down is the same as during the warm-up.

Included as part of the warm-up and cool-down is the improvement of flexibility. Stretching exercises should be performed for 20 – 30 seconds in a range of motion that produces only mild tension. Each stretching exercise should be repeated 2 – 3 times.

## FLEXIBILITY

When stretching, follow these basic rules:

- Stretch slowly
- No bouncing
- No pain
- Stretching is not competitive
- Breathe slowly to help you relax
- Stretching should feel good

The following are examples of stretching exercises, along with a picture of each exercise. Included with each exercise is a list of the muscles which are being stretched. Each exercise follows the basic guidelines previously discussed.

### Knee to Chest



*Glutes, Low Back, Hamstrings, Quadriceps*

- Lay flat on your back with knees bent.
- Grab under the right thigh and pull knee toward chest until you feel mild tension.
- Repeat with other leg.

### Leg Cross



*Piriformis, Glutes, Low Back*

- Lay flat on your back with knees bent.
- Place your right outer ankle on the top of your left thigh.
- Grab under left thigh and pull left knee toward chest until you feel mild tension.
- Repeat with other leg.

### Side Quadricep Stretch



*Quadriceps, Hip Flexors, Abdominals*

- Lay on your left side.
- Grab the right shin, just above your right ankle.
- Slowly pull right foot toward right buttock while pushing right hip forward.
- Repeat with other leg.

## Straddle Stretch



### *Groin, Hamstrings, Low Back*

- Sit upright with legs straight.
- Spread legs as far as you comfortably can.
- Keeping legs straight, but not locking knees bend forward at the waist.

## Calf Stretch



### *Calves*

- Lean forward against a wall or other solid object.
- Place left foot ahead of right foot.
- With right leg straight, lean forward on left leg while keeping right heel firmly on the floor.
- Repeat with other leg.

## Upper Back Stretch



### *Upper Back, Posterior Deltoids*

- Sit with legs straight in front.
- Twist your upper back, crossing left arm across chest and place right hand on floor.
- Slowly twist until you feel mild tension.
- Repeat on other side.

## Chest Stretch



### *Chest, Shoulders, Biceps*

- Stand with shoulder against a wall.
- Place right palm on the wall.
- Slowly turn your body away from the wall until you feel mild tension.
- Repeat on other side.

## Triceps Stretch



### *Triceps, Posterior Deltoids*

- Stand upright and extend right arm over head.
- Grab right elbow with left hand and place right hand on right shoulder blade.
- Slowly push right elbow backward until mild tension is felt.
- Repeat with other arm.

## CARDIOPULMONARY ENDURANCE PROGRAM

Cardiopulmonary endurance is the ability of the cardiovascular and respiratory systems to deliver oxygen to working muscles. It consists of both aerobic and anaerobic energy systems.

### AEROBIC FITNESS

During aerobic activities, the intensity of the exercise is low enough for the cardiopulmonary system to meet the oxygen demands of the working muscles. Aerobic activities include bicycling, swimming, climbing stairs, and running when performed at a low enough intensity.

### ANAEROBIC FITNESS

During anaerobic activities, the intensity of the exercise is so high that the working muscles' demands for oxygen exceed the cardiopulmonary system's ability to deliver it. Because adequate oxygen is not available, waste products, such as lactic acid, accumulate. This type of intense activity can only be short in duration. Examples of anaerobic activities include sprinting and powerlifting.

### TYPES OF TRAINING

In order to improve both your aerobic and anaerobic fitness specific to the Candidate Physical Ability/Agility Test, one's training program should consist of both an aerobic training program and an interval training program.

### AEROBIC TRAINING

The cardiopulmonary endurance program should begin at a level that is considered "moderately difficult", but not "difficult". This program should be done three to five days per week. Your intensity should not be so high that you cannot speak during the exercise. Another method to measure your intensity level is to exercise within your target heart rate range (THRR). This is a range of heart rates within which you can exercise safely, yet still benefit aerobically. You can calculate your THRR by using the following formula:

$$220 - \text{age (60\% - 90\%)} = \text{THRR}$$

Example:

$$\begin{aligned} 220 - 37 (\text{age}) &= 183 (\text{max HR}) \\ 183 \times .60 &= 109.8 = 110 (60\%) \\ 183 \times .90 &= 164.7 = 165 (90\%) \\ \text{THRR} &= 110 - 165 \text{ bpm} \end{aligned}$$

### INTERVAL TRAINING

Interval training involves a repeated series of exercise activities interspersed with rest or relief periods. This type of training is excellent for improving both aerobic and anaerobic endurance. For example, one can perform running intervals on Tuesdays and Thursdays. It is important that interval days have at least one day of slow, easy running between them. This provides the recovery necessary to prevent over-training.

Example of interval training:

Monday:	Run 3 miles at an easy pace.
Tuesday:	Run 90 seconds at a somewhat hard pace then walk for 90 seconds. Repeat this for a total of 3 miles.
Wednesday:	Run 3 miles at an easy pace.
Thursday:	Run 90 seconds at a somewhat hard pace then walk for 90 seconds. Repeat this for a total of 3 miles.
Friday:	Run 3 miles at an easy pace.

## MUSCULAR STRENGTH/ENDURANCE PROGRAM

Circuit training is a method of resistance training designed to increase muscular strength, muscular endurance, and cardiovascular endurance simultaneously. It contains numerous exercises that are performed one immediately after the other with little or no rest between exercises. Circuit training can prepare you specifically for the Candidate Physical Ability/Agility Test. The number of times the circuit is repeated depends on the goals and experience of the individual. The entire body can be trained by varying the muscle group exercised. The weight and repetitions can be altered to emphasize muscular strength, muscular endurance, or cardiovascular endurance.

### HELPFUL CIRCUIT TRAINING HINTS

1. Warm up properly with a couple of minutes of easy walking or bicycling and some light stretches.
2. Move immediately from the cardio stations to the strength training stations.
3. Choose a weight and perform 12 to 15 repetitions the first set.
4. If 12 to 15 repetitions can be performed somewhat easily, then increase the weight and perform 10 – 12 repetitions the second set.
5. Move immediately from each station to the next.
6. Use proper form on every repetition of every lift, reducing weight if necessary.
7. Repeat the workout, eventually working up to a maximum of three circuits at a time.
8. Cool down properly with a couple of minutes of easy walking or bicycling and some light stretches.

The following is a sample of a circuit training program currently performed by members of the Grand Island Fire Department. Included at the end of this sample are pictures of the strength training exercises with brief descriptions. Included in the descriptions is a list of the specific muscles used and the events in which they are used.

### Circuit Training Program

1. Cardio exercise at 60% max HR for 2 minutes
2. Bench press, 10 – 12 repetitions
3. Crunches, 25 repetitions
4. Cardio exercise at 70% max HR for 2 minutes
5. Lat pull down, 10 – 12 repetitions
6. Squats, 10 – 12 repetitions
7. Cardio exercise at 70% max HR for 2 minutes
8. Dumbbell curl, 10 – 12 repetitions
9. Back extensions, 15 repetitions
10. Cardio exercise at 70% max HR for 2 minutes
11. Rotator cuff internal and external rotation, 15 repetitions each
12. Dumbbell military press, 10 -12 repetitions

### Bench Press



*Pectorals, Deltoids, Triceps*

**Events: ladder carry, raise, and extension; forcible entry; pike pole; ventilation/sled**

Pick appropriate weight to overload above muscles, but not so heavy as to cause injury or failure.

- Lie on a bench with your feet flat on floor.
- Hold bar with arms shoulder-width apart or slightly wider.
- Lower bar to middle of chest.
- Push bar up to starting position.
- Inhale while lowering and exhale while pushing back up.

## Abdominal Crunches



### *Abdominal Muscles*

#### **Events: All events**

- Sit on ground with knees bent at 90 degrees.
- Keeping feet flat on floor and hands at your sides, slowly curl your torso so your chin approaches your chest.
- Do not raise torso to more than a 45-degree angle off the floor.
- Slowly return to slightly above your starting position, keeping tension on abdominal muscles at all times.
- Exhale while curling up and inhale while lowering torso back down.

## Lat Pull Down



### *Latissimus Dorsi, Rhomboids, Posterior Deltoids, Biceps*

#### **Events: hand line advancement/withdrawal; ladder carry, raise, and extension; forcible entry; pike pole; ventilation/sled; victim rescue**

Pick appropriate weight to overload above muscles, but not so heavy as to cause injury or failure.

- Seat height should allow for full range of motion.
- Hold bar in chin-up grip with hands close together and palms toward face.
- Pull bar straight down to just below the chin.
- Exhale while pulling weight down.
- Return to starting position.

## Squats

### *Quadriceps, Hamstrings, Glutes, Calves*

#### **Events: High rise pack, hand line advancement/withdrawal; ladder carry, raise and extension; forcible entry; pike pole; victim rescue; aerial climb; equipment carry.**



Pick appropriate weight to overload above muscles, but not so heavy as to cause injury or failure.

- Stand so that barbell rests comfortably across shoulders.
- Slowly lift barbell off squat rack.
- Stand with your feet flat about shoulder-width apart with toes pointed slightly outward.
- Lower weight until knees are flexed at 90 degrees.
- Push weight up while exhaling.
- Stop just short of locking your knees.
- Keep knees in alignment with feet.
- Keep head in neutral position or look slightly upward to keep back straight.
- Use a weight-lifting belt for back support.

## Dumbbell Curls

### *Biceps, Forearms*

#### **Events: hand line advancement/withdrawal; ladder carry, raise, and extension event; forcible entry; ventilation/sled; victim rescue; pike pole; equipment carry**



Pick appropriate weight to overload above muscles, but not so heavy as to cause injury or failure.

- Sit with feet shoulder width apart.
- Sit straight with back flat against seat back.
- Begin with arms down at sides.
- Bend right elbow, bringing the dumbbell toward the right shoulder.
- Slowly lower dumbbell to starting position.
- Exhale while raising weight and inhale while lowering weight.
- Repeat sequence on opposite side.

## Back Extensions



*Erector Spinae (Lower Back), Glutes*

**Events: All events**

- Lie face down on floor with feet shoulder-width apart.
- Place hands behind head.
- Contract lower back muscles and glutes to raise chest off floor.
- Relax and lower to starting position.
- Exhale while raising chest and inhale while lowering chest.
- Exercise can also be performed while using a stability ball.

*Note: Do not raise your chest so high as to cause discomfort in the lower back.*

## Rotator Cuff Internal and External Rotation

*Supraspinatus, Subscapularis, Infraspinatus, Teres minor*

**Events: ladder carry, raise, and extension; pike pole; forcible entry; hand line advancement/withdrawal; equipment carry; ventilation/sled.**



### Internal Rotation

- Stand with feet shoulder width apart.
- Flex arm 90 degrees keeping elbow at side.
- Stand at a distance which will keep the most appropriate tension on the elastic band, but not so heavy as to cause injury or failure.
- Rotate arm inward towards chest while keeping elbow at side.
- Relax and return to starting position.
- Exhale while rotating arm inward, inhale while relaxing.

### External Rotation

- Stand with feet shoulder width apart.
- Flex arm 90 degrees keeping elbow at side.
- Stand at a distance which will keep the most appropriate tension on the elastic band, but not so heavy as to cause injury or failure.
- Rotate arm outward while keeping elbow at side.
- Relax and return to starting position.
- Exhale while rotating arm outward, inhale while relaxing.



*Note: Above exercises can be performed with light dumbbells while lying on side.*

## Dumbbell Military Press



*Deltoids, Triceps, Trapezius*

**Events: ladder carry, raise, and extension; pike pole; ventilation/sled**

Pick appropriate weight to overload above muscles, but not so heavy as to cause injury or failure.

- Raise two dumbbells to height of shoulders.
- With palms facing forward, alternate pressing each dumbbell upward toward the ceiling.
- Exhale while lifting.
- Keep head in neutral position, back straight and flat against seat back.
- Repeat with other arm.

If you have any questions concerning the Candidate Physical Ability/Agility Test or ways to prepare for the test, contact Jeff Engberg, MA, FF/NREMT-P at Fire Station 1 – Phone 308-385-5300 or contact Fire Administration – Phone 308-385-5444 ext.220.

Sources: IAFF/IAFC/ACE Peer Fitness Trainer Reference Manual  
IAFF/IAFC/ACE Peer Fitness Trainer Curriculum Student Manual