



Functional Fitness Training Guide

Information for applicants and incumbent recruits

Introduction

24 hours a day, every day of the year, MFS firefighters are responsible for protecting the South Australian community and infrastructure from fire and other emergencies. Types of emergencies our firefighters attend include;

- structure fire
- road crash rescue
- confined space rescue
- rope rescue
- urban search and rescue
- hazardous materials incidents.

Firefighting is a rewarding career and provides the unique opportunity of ongoing career development, but it is not for everyone. If you are thinking about becoming a Firefighter with the MFS, consider if the following points are a good fit for you:

- A good Firefighter is community minded, a quick thinker, problem solver and a team player. You must be able to use your good judgement and initiative in respectfully assisting all members of our community.
- **Firefighters must be physically and mentally fit and healthy.** You must be resilient and have the ability to reflect and self-assess in order to work through what may sometimes be emotionally challenging circumstances.
- The MFS operates on a clearly defined command rank structure. As a full-time firefighter you will need to follow orders and direction from senior officers to support operational requirements.
- Firefighting is a highly skilled profession. Firefighters are expected to continually develop their technical knowledge and expertise. As a Firefighter you will have to complete mandatory study modules for a minimum of six years (not including the recruit course).
- Full-time Firefighters work on a shift roster over four days; two 10 hour days followed by two 14 hour nights. This includes weekends and public holidays. This system offers a great deal of flexibility but may also mean you will be required to work on important days such as Christmas, Easter and other special days.



To ensure fairness when selecting people to fulfil the role of firefighter, the South Australian Metropolitan Fire Service (MFS) must show a direct relationship between the level of fitness required and the physical demands of the job. To achieve this, the MFS has designed and developed a series of work-related physical fitness and strength tests that reflect the nature of the physical work undertaken by operational fire fighters.

The purpose of this document is to provide candidates with information on training to prepare for the two fitness testing components of the recruit selection process, the Physical Aptitude Test Stage 1 and the Physical Aptitude Test Stage 2.

This document should also be used by successful applicants to assist in maintaining an adequate level of fitness, prior to the start of their recruit course. This will lower the risk of injury during a recruit course.

Before you get started

It is recommended all candidates complete a Physical Activity Readiness Questionnaire (PAR-Q) prior to commencing their preparation program. This can be found in Part 2 of this guide. If you are unsure, see your General Practitioner prior to making any significant changes to your physical activity and exercise behaviours.

Getting started

There are no short cuts to developing the fitness qualities required to pass the PAT process and have a successful career as a firefighter. You should commence training well in advance of considering an application. At least 6 to 12 months of consistent and structured training prior to your PAT is recommended.

Progress at your own pace

You should gradually increase your training frequency, intensity (e.g. the amount of weight you are lifting) and duration of your training. Large increases over a short period of time will increase your risk of injury.

Learning technique is also critically important in preventing injury. If you are unfamiliar with the training outlined in this document, it may be necessary to hire an exercise professional such as a strength and conditioning coach, exercise scientist, personal trainer or exercise physiologist to assist in undertaking your training program.

Make sure your body has time for rest and recovery. This may include making time for 1 to 3 rest/recovery days per week. On these days perform light physical activity such as walking, stretching or yoga.

ADULT PRE-EXERCISE SCREENING SYSTEM (APSS)

This screening tool is part of the Adult Pre-Exercise Screening System (APSS) that also includes guidelines (see User Guide) on how to use the information collected and to address the aims of each stage. No warranty of safety should result from its use. The screening system in no way guarantees against injury or death. No responsibility or liability whatsoever can be accepted by Exercise & Sport Science Australia, Fitness Australia, Sports Medicine Australia or Exercise is Medicine for any loss, damage, or injury that may arise from any person acting on any statement or information contained in this system.

Full Name: _____

Date of Birth: _____ Male: ☐ Female: ☐ Other: ☐

STAGE 1 (COMPULSORY)



AIM: To identify individuals with known disease, and/or signs or symptoms of disease, who may be at a higher risk of an adverse event due to exercise. An adverse event refers to an unexpected event that occurs as a consequence of an exercise session, resulting in ill health, physical harm or death to an individual.

This stage may be self-administered and self-evaluated by the client. Please complete the questions below and refer to the figures on page 2. Should you have any questions about the screening form please contact your exercise professional for clarification.

Please tick your response

	YES	NO
1. Has your medical practitioner ever told you that you have a heart condition or have you ever suffered a stroke?	☐	☐
2. Do you ever experience unexplained pains or discomfort in your chest at rest or during physical activity/exercise?	☐	☐
3. Do you ever feel faint, dizzy or lose balance during physical activity/exercise?	☐	☐
4. Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months?	☐	☐
5. If you have diabetes (type 1 or 2) have you had trouble controlling your blood sugar (glucose) in the last 3 months?	☐	☐
6. Do you have any other conditions that may require special consideration for you to exercise?	☐	☐

IF YOU ANSWERED 'YES' to any of the 6 questions, please seek guidance from an appropriate allied health professional or medical practitioner prior to undertaking exercise.

IF YOU ANSWERED 'NO' to all of the 6 questions, please proceed to question 7 and calculate your typical weighted physical activity/exercise per week.

7. Describe your current physical activity/exercise levels in a typical week by stating the frequency and duration at the different intensities. For intensity guidelines consult figure 2.				Weighted physical activity/exercise per week Total minutes = (minutes of light + moderate) + (2 x minutes of vigorous/high) TOTAL = _____ minutes per week
Intensity	Light	Moderate	Vigorous/High	
Frequency (number of sessions per week)	_____	_____	_____	
Duration (total minutes per week)	_____	_____	_____	

- If your total is less than 150 minutes per week then light to moderate intensity exercise is recommended. Increase your volume and intensity slowly.
- If your total is more than or equal to 150 minutes per week then continue with your current physical activity/exercise intensity levels.
- It is advised that you discuss any progression (volume, intensity, duration, modality) with an exercise professional to optimise your results.

I believe that to the best of my knowledge, all of the information I have supplied within this screening tool is correct.

Client signature: _____ Date: _____

FIGURE 1: Stage 1 Screening Steps

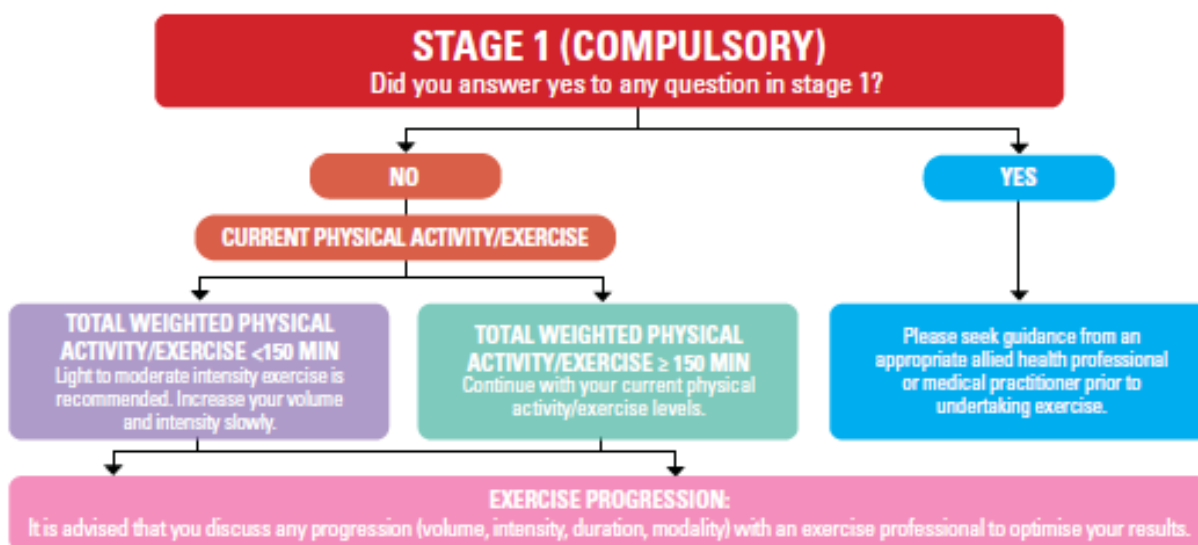


FIGURE 2: Exercise Intensity Guidelines

INTENSITY CATEGORY	HEART RATE MEASURES	PERCEIVED EXERTION MEASURES	DESCRIPTIVE MEASURES
LIGHT	40 to <55% HRmax*	VERY LIGHT TO LIGHT RPE[‡] 1-2	- An aerobic activity that does not cause a noticeable change in breathing rate - An intensity that can be sustained for at least 60 minutes
MODERATE	55 to <70% HRmax*	MODERATE TO SOMEWHAT HARD RPE[‡] 3-4	- An aerobic activity that is able to be conducted whilst maintaining a conversation uninterrupted - An intensity that may last between 30 and 60 minutes
VIGOROUS	70 to <90% HRmax*	HARD RPE[‡] 5-6	- An aerobic activity in which a conversation generally cannot be maintained uninterrupted - An intensity that may last up to 30 minutes
HIGH	≥ 90% HRmax*	VERY HARD RPE[‡] 7	- An aerobic activity in which it is difficult to talk at all - An intensity that generally cannot be sustained for longer than about 10 minutes

* HRmax – estimated heart rate maximum. Calculated by subtracting age in years from 220 (e.g. for a 50 year old person – 220 – 50 = 170 beats per minute).

‡ – Borg's Rating of Perceived Exertion (RPE) scale, category scale 0-10.

Modified from Norton K, L. Norton & D. Sadgrove. (2010). Position statement on physical activity and exercise intensity terminology. J Sci Med Sport 13, 496-502.



Training for Aerobic Fitness (Aerobic Capacity)

The work demands for fire service employees are well documented as requiring considerable physical abilities. Based on several studies, the National Fire Protection Association recommends a minimum aerobic capacity (VO₂max) of 42 mL/kg/minute to meet the measured workload demand for firefighters while also maintaining a reserve capacity to respond to other unanticipated events. Further studies have demonstrated that firefighters with an aerobic capacity below 48mL/kg/min are more likely to be injured. As a result, most fire departments have adopted minimum fitness standards, often emphasizing aerobic capacity as a key measure of fitness.

Physical Aptitude Test – Stage 1

The MFS assess aerobic capacity during the Physical Aptitude Test – Stage 1. The test used is a progressive shuttle run test designed to estimate aerobic fitness (VO₂max). The test gives an estimate of maximum oxygen uptake (VO₂max), which indicates how effectively the body is utilising oxygen.

Candidates must complete level 9.6 in order to successfully pass the Physical Aptitude Test – Stage 1.

Training Recommendations

The following training recommendations are designed to guide you in developing general fitness and are not intended to train you to pass the PAT 1. As the Physical Aptitude Test – Stage 1 is a running based test, it is highly recommended that your preparation includes running. However, there are other forms of aerobic training that will assist in developing your cardiovascular endurance and aerobic capacity, such as:

Cycling

Swimming

Rowing

Various forms of Martial Arts

Circuit based - High Intensity Interval Training

Hiking

It is also critical to practice the beep test prior to attempting the PAT1, as learning how to correctly pace yourself and to be efficient in slowing down and changing directions will increase your chance of successfully passing.



Beginner Program

For those who do not currently run.

Intermediate Program

For those who run occasionally, but do not play a field sport or follow a consistent running program.

Advanced Program

For those who play a field sport or run recreationally, this program utilises High Intensity Interval Training to develop the ability to run at higher speeds, for longer periods of time.

Training for Muscular Strength and Endurance (Resistance Training)

In addition to aerobic fitness, firefighting requires high levels of muscular strength, power and endurance. Firefighters are required to perform numerous tasks which stress these physical capacities. Examples of these tasks can include dragging and operating charged hose (20 - 90kg), lifting various equipment under time pressures (15kg - 38kg), or rescuing other persons (potentially in excess of 100kg). These tasks are often performed while wearing heavy personal protective clothing and equipment (25kg).

The PAT2 includes many of these tasks and to successfully complete the PAT2, a substantial level of full-body strength, power and endurance is required.

Resistance training will help to develop these qualities and give you the best opportunity to pass the PAT2. This section outlines some key considerations and provides some basic resistance training programs for different levels of experience and access to varied equipment.

It also includes a circuit style workout to help familiarise you with the demands of the PAT2.

Program 1 – Full Gym

Program 2 – Body Weight (plus bands or small dumbbells)



Full Gym Access Program

Day 1 – Strength Training + Cross Training

Day 2 – Conditioning

Day 3 – Strength Training

Day 4 – Circuit Workout (PAT 2 Simulation)

Warm Up

- **Easy Leg Swings** x 10 each leg
- **Lunge + Twist** x 10
- **Knee Hugs** x 5 each side
- **Standing Calf Raise** x 10
- **Lunge Calf Stretch** x 30 seconds each side
- **Windmill Stretch** x 10
- **Walking Hamstring Sweep** x 10
- **Open/Shut the Gates** x 5 each side

Strength Training

Week 1 - 3

Movement	Exercise	Sets	Reps	RPE	Rest
Double Leg Lower Body Push	Leg Press / Back Squat / Smith Machine Squat	3	12, 10, 8	Week 1 – RPE 7 Week 2 – RPE 8 Week 3 – RPE 9	45 – 60 sec
Upper Body Vertical Push	Lateral Raise / Arnold Press / Overhead Press	3	12, 10, 8	Week 1 – RPE 7 Week 2 – RPE 8 Week 3 – RPE 9	45 – 60 sec
Hinge	Plate Hug Good Morning / Romanian Deadlift	3	12, 10, 8	Week 1 – RPE 7 Week 2 – RPE 8 Week 3 – RPE 9	45 – 60 sec
Upper Body Horizontal Pull	Supine Row / 1 Arm Dumbbell Row / Seated Row	3	12, 10, 8	Week 1 – RPE 7 Week 2 – RPE 8 Week 3 – RPE 9	45 – 60 sec
Single Leg Push	Leg Extension / Split Squat / Step Up	3	12, 10, 8	Week 1 – RPE 7 Week 2 – RPE 8 Week 3 – RPE 9	45 – 60 sec
Knee Flexion	Swiss Ball Curl / Hamstring Curl / Single Leg SB Curl	3	12, 10, 8	Week 1 – RPE 7 Week 2 – RPE 8 Week 3 – RPE 9	45 – 60 sec
Upper Body Horizontal Pull 2	Bent Over Row / Landmine Row / Single Arm Cable Row	3	12, 10, 8	Week 1 – RPE 7 Week 2 – RPE 8 Week 3 – RPE 9	45 – 60 sec
Upper Body Horizontal Push	Push Up / Incline Press / Bench Press	3	12, 10, 8	Week 1 – RPE 7 Week 2 – RPE 8 Week 3 – RPE 9	45 – 60 sec
Core	Front Plank / Sit Up / Reverse Crunch	3	30 – 60 sec		45 – 60 sec



Week 4 - 6

Movement	Exercise	Sets	Reps	RPE	Rest
Double Leg Lower Body Push	Leg Press / Back Squat / Smith Machine Squat	4	10	Week 4 – RPE 7 Week 5 – RPE 8 Week 6 – RPE 9	30 sec
Upper Body Vertical Push	Lateral Raise / Arnold Press / Overhead Press	4	10	Week 4 – RPE 7 Week 5 – RPE 8 Week 6 – RPE 9	30 sec
Hinge	Plate Hug Good Morning / Romanian Deadlift	4	10	Week 4 – RPE 7 Week 5 – RPE 8 Week 6 – RPE 9	30 sec
Upper Body Horizontal Pull	Supine Row / 1 Arm Dumbbell Row / Seated Row	4	10	Week 4 – RPE 7 Week 5 – RPE 8 Week 6 – RPE 9	30 sec
Single Leg Push	Leg Extension / Split Squat / Step Up	4	10	Week 4 – RPE 7 Week 5 – RPE 8 Week 6 – RPE 9	30 sec
Knee Flexion	Swiss Ball Curl / Hamstring Curl / Single Leg SB Curl	4	10	Week 4 – RPE 7 Week 5 – RPE 8 Week 6 – RPE 9	30 sec
Upper Body Horizontal Pull 2	Bent Over Row / Landmine Row / Single Arm Cable Row	4	10	Week 4 – RPE 7 Week 5 – RPE 8 Week 6 – RPE 9	30 sec
Upper Body Horizontal Push	Push Up / Incline Press / Bench Press	4	10	Week 4 – RPE 7 Week 5 – RPE 8 Week 6 – RPE 9	30 sec
Core	Front Plank / Sit Up / Reverse Crunch	4	30-60 sec		30 sec

RPE based Strength Training

Repetitions in Reserve (RIR) is a strength training concept that refers to the number of additional repetitions an individual believes they could have completed during a set before reaching muscular failure. The Rate of Perceived Exertion (RPE) scale is often used in conjunction with RIR to gauge exercise intensity. The RPE scale typically ranges from 1 to 10, with higher numbers indicating higher effort levels, 10 being maximum “could not perform another rep.”

For example,

RPE 7, an individual has about 3 repetitions left in reserve before reaching failure.

RPE 8, the individual has about 2 repetitions left in reserve, indicating a more challenging set that requires greater effort.

RPE 9, only 1 repetition is left in reserve, signifying a very difficult set that is close to the individual's maximum capacity.



Body Weight Program (No Gym Access)

Movement	Exercise	Sets	Reps
Double Leg Lower Body Push	Body Weight Squat / Squat Jump	4	10-15
Upper Body Vertical Push	Decline Push Up / Pike Push Up	4	10-15
Hinge	Single Leg Good Morning	4	10-15
Upper Body Horizontal Pull	Supine Row / Towel Row	4	10-15
Single Leg Push	Bulgarian Split Squat / Reverse Lunge	4	10-15
Knee Flexion	Feet Elevated Hip Extension / Towel Curls	4	10-15
Upper Body Horizontal Pull 2	Wall Angles / Swimmers / Pull Ups	4	10-15
Upper Body Horizontal Push	Push Up / Dips	4	10-15
Core	Front Plank / Sit Up / Reverse Crunch	4	30-60 sec



PAT 2 Simulation – Circuit Workout

Getting familiar with the activities, movements and weights used during the PAT2 will improve your chance of success. The aim of this circuit is to replicate as many of the PAT2 demands as possible.

Some of the weights used in the circuit are substantial, if they are too challenging to begin with, start with a lighter weight and progress towards the loads outlined in the plan below over time.

A 20kg weight vest should be worn for the entire circuit, this is to simulate the additional demands produced by wearing PPE during the PAT 2.

Complete a 5m out and back walk between each exercise.

The total duration of the circuit should take approximately 28 minutes.

Exercise	Distance/Time/Reps	Weight
1. Hose Hold	3-minute hold	Challenging Load - Cable
2. Casualty Rescue	20m	75kg - Sled
3. Ceiling Breach and Pull	4 Rounds 3 reps push + 5 reps pull	27kg push - DB 36kg pull - Lat Pull
4. Ladder Raise	5 Reps	30kg - Barbell
5. Tower Climb 1	32 Stairs	15kg - DB
6. Container Haul	20m/30 reps	20kg - Plate
7. Forced Entry	20 Reps	4.5kg Sledgehammer or MB
8. Tower Climb 2	100 Reps	15kg - DB
9. High Pressure Line Drag	20m + 10m	45kg - Sled
10. Equipment Carry	20m	17.5kg - DB
11. Repeated Container Movement	10m	

Descriptions

Exercise 1, Hose Hold – 3 min – Cable or Band

(weight should be challenging towards the end of the 3 minutes)

Hold a cable or band while maintaining a split stance, the cable or band should be pulling backwards while close to your torso.

Exercise 2, Casualty Rescue – 20m – Sled or Heavy Rope (75kg)

Set Up a Sled or Heavy Rope with a marker 20m away, drag the item backwards the full 20m.



Exercise 3, Ceiling Breach and Pull – 4 Rounds, 3 reps push 5 reps pull – Dumbbell and Lat Pull Down or Pull Up (27kg/36kg)

Perform 3 Reps of a dumbbell goblet squat or squat to press (27kg total), immediately followed by 5 reps of a neutral grip lat pull down (36kg) or pull ups (assisted if required). Complete this superset for 4 rounds with no rest between.

Exercise 4, Ladder Raise – 5 Reps – Barbell (30kg)

Using a 30kg barbell, perform a clean action or upright row to bring the bar to your shoulders, complete 5 reps of overhead press, bringing the bar from your shoulders to full lock out overhead then returning the bar to your shoulders under control.

Exercise 5, Tower Climb and Descent 1 – 32 reps – Step (16cm), Dumbbell (15kg)

While holding a 15kg dumbbell in one hand, step up onto a step and back down. Repeat this 32 times.

Exercise 6, Container Haul – 20m or 30 reps – Cable or Rope and Weight (20kg)

Using 1 arm at a time, alternating, complete 30 reps of a cable row using a rope attachment or drag a 20kg weight for a length of 20m.

Exercise 7, Forced Entry – 20 reps – Sledgehammer or Medicine Ball (5kg)

Complete 20 reps of either hitting a tire with a sledgehammer or a standing rotational med ball throw.

Exercise 8, Tower Climb and Descent 2 – 100 reps – Step (16cm), Dumbbell (15kg)

While holding a 15kg dumbbell in one hand, step up onto a step and back down. Repeat this 100 times.

Exercise 9, High Pressure Line Drag – 30m – Sled or Heavy Rope (45kg)

Using a Sled or Heavy Rope slung over one shoulder, advance forward 20m at a steady pace. Once you reach the 20m mark, lower the rope and turn to face the load, use a hand over hand pulling motion to pull the sled or rope a further 10m.



Exercise 10, Equipment Carry – 20m – Dumbbell or Medicine Ball (17.5kg)

Using a farmers carry lift, transport a 17.5kg dumbbell 20m, walk 10m out and 10m back carrying no equipment before picking up the dumbbell a second time. Repeat this process until the dumbbell has been moved 20m three times.

Exercise 11, Repeated Container Movement – 3 minutes – Dumbbell (10kg)

Move a 10kg dumbbell between two points, 10m apart, between rep complete 3 body weight squats and 2 push ups. Complete this 12 times within the 3 minutes.

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