Fit for Duty

Physical Training Guide

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Part 1: Introduction

Firefighting is a challenging physical occupation. Many tasks require high levels of physical endurance, strength and power. On a daily basis, and during emergency responses, firefighters with ACT Fire & Rescue may be tasked to carry and use hydraulic rescue tools, drag hoses, lift ladders and rescue incapacitated casualties. To ensure that firefighters are able to safely and competently complete physical work tasks, all potential recruits are required to undertake the Physical Aptitude Test (PAT).

The *Fit for Duty Physical Training Guide* has been developed to assist applicants to prepare for the ACT Fire & Rescue PAT. The training program has been designed to assist you in maximising your physical conditioning in the areas of strength and aerobic fitness. While these programs have been designed to minimise the need for equipment, many elements can be simulated within a gym environment, and you are encouraged to seek professional assistance where necessary.

Firefighting requires that you can undertake many physical tasks, often in time-critical, high-stress environments. As a firefighter you will be asked to manipulate heavy equipment and possibly rescue people, often on unstable terrain or in awkward positions. Thus, maximising your strength, power and aerobic fitness is critical to your safety and also to completing your work tasks.

Be aware that completing this program will not guarantee success in the PAT.

Instructions for completing the program

Before you start

Ensuring that you are physically capable of beginning any strength and conditioning program is critical to ensuring your safety. We recommend that you complete a *Physical Activity Readiness Questionnaire* (Part 2 - attached) prior to commencing this program. If you have not been physically active during the past 6 months, we recommend consulting with your GP.

Hydration

Ensuring that you are properly hydrated will assist you with safely completing any physical training program, particularly when exercising in the hotter months. Try to ensure that you don't become dehydrated prior to, during and also following exercise bouts, by drinking small amounts of water "to thirst". You might consider weighing yourself each morning on waking, to assess possible changes in your hydration status and also by weighing before and after any exercise session.

Be aware of drinking too much water, as this can be just as dangerous as not drinking enough. Listen to your body and maintain your hydration appropriately.

Importance of a warm up

Prior to beginning any physical training program, it is critical that you gradually raise your heart rate and warm your muscles. Try to avoid “static” or “ballistic” stretching and instead combine movements that mobilise a range of joints and muscles at a low intensity to prepare your body for the movements that you are about to perform. You should aim to have a light sweat at the end of your warm up.

Progress slowly and ensure adequate rest

Rapidly increasing the amount or intensity of exercise is likely to see you get injured. Injury will slow your progress, which will dramatically reduce your chances of success in the PAT. As such, slowly increasing your work should be the guiding principle of your training program. One way of doing this is using the 10% rule (ie only increase your weight / distance by no more than 10% per week) to minimise the risks of overtraining and injury.

Ensure that you get plenty of rest, as this is when your body adapts and improvements are made. Aim to have a day of rest between strength training sessions, try not to work the same muscle groups (ie upper body / lower body) and listen to your body.

Should you feel that you might be getting sick or injured, then you are urged to seek medical advice as early intervention may prevent a long rehabilitation process.

Part 2 – Physical Activity Readiness Questionnaire

ADULT PRE-EXERCISE SCREENING TOOL

This screening tool does not provide advice on a particular matter, nor does it substitute for advice from an appropriately qualified medical professional. 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 and Sports Science Australia, Fitness Australia or Sports Medicine Australia for any loss, damage or injury that may arise from any person acting on any statement or information contained in this tool.

Name: _____

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

STAGE 1 (COMPULSORY)

AIM: to identify those individuals with a known disease, or signs or symptoms of disease, who may be at a higher risk of an adverse event during physical activity/exercise. This stage is self administered and self evaluated.

Please circle response

1.	Has your doctor ever told you that you have a heart condition or have you ever suffered a stroke?	Yes	No
2.	Do you ever experience unexplained pains in your chest at rest or during physical activity/exercise?	Yes	No
3.	Do you ever feel faint or have spells of dizziness during physical activity/exercise that causes you to lose balance?	Yes	No
4.	Have you had an asthma attack requiring immediate medical attention at any time over the last 12 months?	Yes	No
5.	If you have diabetes (type I or type II) have you had trouble controlling your blood glucose in the last 3 months?	Yes	No
6.	Do you have any diagnosed muscle, bone or joint problems that you have been told could be made worse by participating in physical activity/exercise?	Yes	No
7.	Do you have any other medical condition(s) that may make it dangerous for you to participate in physical activity/exercise?	Yes	No

IF YOU ANSWERED 'YES' to any of the 7 questions, please seek guidance from your GP or appropriate allied health professional prior to undertaking physical activity/exercise

IF YOU ANSWERED 'NO' to all of the 7 questions, and you have no other concerns about your health, you may proceed to undertake light-moderate intensity physical activity/exercise

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

Signature _____ Date _____

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Part 3: Cardiovascular fitness training

Cardiovascular fitness is extremely important for firefighters. By maximising your fitness you can complete work tasks at lower relative intensities, allowing you to work for longer periods of time before you become fatigued. Before commencing your cardiovascular fitness training program, you must assess your fitness level and plan accordingly.

To achieve the levels required to complete the PAT, ideally you will engage in cardiovascular fitness training between **3** and **4** times per week. Your body uses 2 different energy systems and each of them plays a critical role in your ability to work safely and effectively as a firefighter. You should aim to complete a session that incorporates at least one of these elements in each session, although some sessions can combine elements of both:

> *Aerobic Energy:* The aerobic energy system relies on the use of oxygen to burn fuel, including fat stores in your body. Activities that test the aerobic energy system generally require you to exercise for a period in excess of **20 minutes** and should leave you puffing, but not exhausted. Aerobic training should generally be done at <80% of your predicted maximum heart rate.
>
> **Examples of Aerobic exercise:** *Continuous jogging, swimming, cycling*
>
> *Anaerobic Energy:* The anaerobic energy system provides the primary source of fuel when exercise intensity makes using oxygen ineffective. Exercises that primarily use the anaerobic energy system generally last for up to **2 minutes** and result in the production of lactic acid (when muscles start to "burn"). Anaerobic training will generally occur >80% of your predicted maximum heart rate.
>
> **Examples of Anaerobic exercise:** *High intensity interval training (HIIT), stair climbing (weighted and unweighted)*

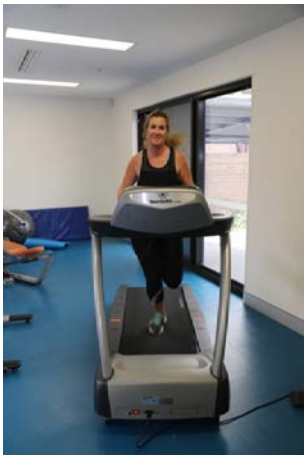
You may wish to consider purchasing a heart rate monitor and/or a GPS unit (or phone app) to assist you in monitoring your intensity and your progress however this is not necessary to complete the program.

Table 1: Age predicted Maximum heart rates (Inbar et al., 1994). Predicted heart rates have an error of ± 6 beats per minute.

Age	Predicted Max HR	Age	Predicted Max HR	Age	Predicted Max HR
20	192	**29**	186	**38**	180
21	191	**30**	185	**39**	179
22	191	**31**	185	**40**	178
23	190	**32**	184	**41**	178
24	189	**33**	183	**42**	177
25	189	**34**	183	**43**	176
26	188	**35**	182	**44**	176
27	187	**36**	181	**45**	175
28	187	**37**	180		

Sample Training Program (3-4 days per week)

Day 1	Day 2	Day 3	Day 4 (optional)
Long slow distance: (<80% HR max) (should be able to talk when you are running) Depending on your fitness you should aim to build this up to 40 minutes of continuous running prior to the PAT. *Remember the 10% rule*	**Interval training:** (>80% HR max) (should not be able to complete full sentences when running) Complete a range of work/rest periods depending on your fitness. Ideal ratio should be 4 x work / 1 x rest (by time or distance). Example session: **Beginner:** 200 metres run / 50 metre walk (aim to complete 5 repeats) **Moderate:** 400 metres run / 100 metre jog (aim to complete 5 repeats) **Advanced:** 4 minutes run / 1 minute walk/jog (aim to complete 5 repeats)	**Stair / Hill Climb** (>80% HR max) (should not be able to complete full sentences when running) Find a long set of stairs or a hill >5% incline. Ensure that you are properly warmed up prior to starting. Aim to climb for 2 minutes and walk back to the start before repeating Example Session: **Beginner:** Unweighted climb (aim for 5-8 repeats) **Moderate:** Unweighted climb – running (aim for 5-8 repeats) **Advanced:** Weighted climb (23 kg backpack) (aim for 5-8 repeats)	**Mixed Session / Cross train** Try to complete a session that incorporates elements of each of the other 3 days. This session could include hill segments, short unstructured intervals (Fartlek training). To minimise possible overuse injuries, consider a different type of exercise (cross-training)



Part 4: Strength Training

Introduction

The Strength training component of the *Fit for Duty* package is a 12-week program, designed specifically for those who may have a limited strength training background.

The program has two specific 4-week strengthening phases followed by a 4 week final preparation phase. During this final preparation phase you are encouraged to seek an exercise professional to ensure that you can safely complete any strengthening and power tasks.

Core strengthening exercises should be completed every second day throughout the training program.

Phase 1: General Strengthening / preparation for strength training

Phase 2: Hypertrophic Strength gain program

Phase 3: Heavy Strength / power **(not recommended without professional Supervision and/or extensive lifting experience)**

Note: You are encouraged to slowly progress through any increases in weight or intensity and to “listen to your body” and rest should you feel any soreness or injury.

Core Strengthening

Maintaining a strong “core” is critical to your ability to safely complete physical work tasks as a firefighter. “Core strength” refers to the muscles associated with the pelvis, lower back, hips and abdomen. When you are working, good core strength assists you to maintain balance and stability, particularly when operating with unstable loads or on uneven terrain. Good levels of core strength will also assist you in mitigating the risk of injury.

All exercises should be done without weight until you can safely complete the movement pattern. At this point, you are encouraged to slowly add weight where appropriate - both unilaterally and also bilaterally. Tasks should be completed as slow as possible to maximise the need for stabilisation.

Core Strengthening Exercises	
Bridging	Scrum Squat
Single leg squat	Rotary Stability
Single leg pickup	Forward / Rear Inline Lunge

Bridging

Instruction

- Lie on your back, with knees bent and feet flat on the floor
- Have your arms flat on the ground beside your body
- Squeeze your buttock muscles and push your hips up towards the ceiling until your knees, hips and shoulders form a straight line (feet, shoulders and head remain on the ground)
- Hold for 20 seconds and return to the start position
- Rest for 10 seconds
- Complete 6 repetitions (by 3 sets)

Alternate/progression

- Complete the process above with arms across chest
- When in the raised position, lift one leg off the ground and hold, ensuring your hips do not drop

Single leg squat

Instruction

- Stand with feet close together
- Raise one foot until the knee is at a right angle
- Lower your body until the foot touches the ground
- Repeat 3-5x and then swap leg (aim for 3 sets)

Alternate/progression

- Balance on a step and squat to below 90°
- Carry weight (in a backpack, in two hands, in one hand)

Single leg pickup

Instruction

- Stand with feet close together
- Place a ball/small object approx 1 metre in front of your body
- Lift one foot behind your body
- Bend forward at the hip, reach and pick up the object
- Return to standing position
- Reach forward and replace the object on the ground
- Repeat 3-5x and then swap legs (aim for 3 sets)

Alternate/progression

- Increase the size or weight of the object
- Change the shape of the object so it is harder to pick up
- Increase/decrease the distance of the object to you

Forward/rear Inline lunge

Instruction

- Stand with feet shoulder-width apart
- Mark out (locate) a straight line on the ground
- Take one large step forward and place your foot on the line in front of you (step must be long enough that the knee should not be in front of the toes when you lower it)
- Bend your rear knee until it is approximately 5cm above the floor (keep your torso upright and draw your navel in towards your spine)
- Return to the original position
- Repeat 3-5x and then swap legs (aim for 3 sets)

Alternate/progression

- Complete with a weighted backpack (~20kg)

Scrum Squat

Instruction

- Adopt a 'crawl/walk position with your left hand and both feet on the ground
- Ensure that you maintain a neutral spine by having a straight line between your ears, shoulders and hips and some bend in your knees
- Push forward by straightening your knees and rock back to the original position
- Repeat 3-5x and swap hands (aim for 3 sets)

Alternate/progression

- When in the forward position, lift opposite/same leg from the ground and extend straight out behind
- Increase the number of repetitions
- When in the forward position, bend arm slightly and lower chest **(only for advanced individuals)**

Rotary Stability

Instruction

- Begin on the ground with knees (approx 90°) and hands on the ground, approximately shoulder-width apart
- In one motion extend the right hand and the left foot out straight.
- Hold for 5 seconds
- Bring right elbow to left knee
- Hold for 5 seconds
- Extend the right hand and the left foot out straight
- Return to starting position
- Repeat 3-5x and swap hand/leg (aim for 3 sets)

Alternate/progression

- Increase the number of repetitions
- Increase the duration of the holds

Muscular Strengthening Program

A good level of whole body muscular strength and endurance is essential for firefighters to safely complete their daily work tasks and operate equipment during emergency responses. Weight carriage in the fire service generally requires that you can manipulate a range of different shaped objects, sometimes in limited space or in positions that are not ideal for general lifting. As such, you are encouraged to use a range of objects (within the recommended weight range) to maximise your general strength.

This 16-week program is designed to be undertaken by individuals who have limited strength training experience. The program is broken into 3 phases, with only phase 1 and phase 2 presented in this training guide. Undertaking phase 3 requires that you work with a fitness professional in order to maximise your safety and reduce your risk of injury, while maximising your strength and power.

Phase 1: General Strengthening / preparation for strength training

Phase 2: Hypertrophic Strength gain program

Phase 3: Heavy Strength / power **(not recommended without professional Supervision and/or extensive lifting experience)**

Note: Core strengthening should be completed during all phases of strength training

General Safety considerations

- *Always keep your spine in a neutral position. This includes your neck*
- *Never lift anything that is too heavy for you.*
- *When lifting loads, try to keep them close to your centre of mass. This will assist you in stabilising the load and reduce the risk of injury.*
- *Maximise your base of support (ie legs slightly apart when lifting). This will maximise your balance and reduce the risk of falling and injury.*
- *Control when lifting is essential. Swinging the load will not give the muscles the appropriate stimulus and will increase your risk of injury.*

Phase 1: General Strengthening / preparation for strength training (up to 6 weeks)

Phase 1 is designed to slowly increase your overall body strength prior to engaging in a more structured strength training package (Phase 2). Phase 1 is designed to include a number of "body weight" exercises and to be completed in a "circuit fashion".

Weight (where required) should be relatively low until you are familiar with the task and then slowly increased as necessary. If unsure, you are encouraged to start with a lower weight.

Body-Weight Circuit *(aim for 2 sets of 5 repetitions, then increase to 10, 15, 20 as you improve)*

1) **Push ups**

- Start with hands shoulder width apart, balancing on toes (or knees to start)
- Lower your chest, keeping your back, neck and legs in a straight line
- Return to the starting position
    - ***Modifications***
        - Change hand positions – wider, narrower, offset
        - Consider adding a weight vest

2) Pull ups

- Find an object that you can “hang” below. You should be able to fully extend your arms. Alternately a TRX kit would suffice.
- Position yourself under the “bar” with your body rigid with the bar approximately in line with the middle of your chest
- Slowly bring your chest up to the bar while maintaining a rigid body
- Return to the starting position
    - **Modifications**
        - Alternate your location under the bar (higher or lower)
        - Consider adding a weight vest
        - Consider more traditional “chin ups”


3) Bench dips

- Find a bench (in a park) or gym
- Position yourself at the front of the bench, hands either side of you
- Move in front of the bench and lower you body until your arms are at right angles
- Return to the starting position
    - **Modifications**
        - Consider working on an unstable object (eg swiss ball)
        - Consider adding a weight vest
        - Consider traditional “dips”


Weight circuit

1) Bicep curl into overhead press

Weights	Approximately 30 – 40 % of your maximum
Sets	2 – 3 sets
Repetitions	16 -24 repetitions

Equipment

- Dumbbell or similar object (ensure that you can safely maintain grip throughout the movement)

Instructions

- Start with you feet positioned shoulder-width apart, knees slightly bent and arms hanging straight in front holding the weight
- Keeping your palms facing the front, bend from the elbow and “curl” the weight to shoulder height
- Squat slightly and then as you stand up, extend the weight directly above (but slightly in front of) your head
- Lower the weight to your shoulders
- Reverse the “curl” to the starting position

2) Farmers walk (double sided)

Equipment

- Dumbbell or similar object (in the PAT you will be asked to complete this task with a drum weighing 20kg – consider a similar weight and shaped object)

Instructions

- Perform a “half squat” to pick weight from the floor and hold directly by the side of your leg (ensure that your back is straight when lifting and that you bend at the knee)
- Walk 50 metres in total (depending on space this may be 5 x 10m) and place the weight back on the ground (bending at the knee – back straight)
- Pick up the weight in the other hand and complete 50m.
- Repeat 4 – 6 times

3) Goblet squat

Weights	Approximately 30 – 40 % of your maximum
Sets	2 – 3 sets
Repetitions	16 -24 repetitions

Equipment

- Dumbbell or similar object

Instructions

- Stand with your legs shoulder-width apart knees slightly bent. Hold the weight in two hands at chest height
- Keeping your back straight, bend at the knees moving your hips back as if sitting down (ensure no arching of the lower back)
- When squatting, ensure that your knees don't extend past your toes
- Aim to progress to squats at depths where your thighs are parallel to the ground
- Return to the starting position

Phase 2: Hypertrophic Strength gain program

Phase 2 of the strength training program, is designed to increase your strength, along with muscle size and power. Having greater muscle mass allows for greater power which will maximise your chances of success in the PAT.

Weights	Approximately 75-80 % of your maximum
Sets	2 -3 sets
Repetitions	6 - 8 repetitions
Movement cadence	Aim for a cadence of 1 second lift (concentric phase) / 2 second return (eccentric phase)

Walking Lunges

Equipment

- Dumbbells or similar (eg sandbags)

Instructions

- Grasp dumbbells in both hands
- With feet close together take a step with the right foot to a distance where, when you bend your back leg, front knee is at 90 degrees (ensure knee does not extend past toes)
- Lower rear leg / front leg at the same time until rear knee is nearly touching the ground
- Push back from the front leg to a standing position
- Change to other leg and repeat.

Shoulder Press

Equipment

- Dumbbells/kettlebells or similar

Instructions

- Stand with feet shoulder width apart, grasp weights in each hand
- Bend knees slightly and bring weights to chest height
- In a fluid movement, extend weights up from your shoulder, until arms are almost straight
- Control the descent and return weights to shoulder height
- Repeat 6 – 8 times
- Control descent of weights, bend knees and return weights to the ground

Upright Rows

Equipment

- Weight bar or similar

Instructions

- Start with feet shoulder width apart, bar hanging in front of your body
- In a fluid movement, lift the bar to shoulder height (below chin)
    - Ensure that you keep the bar close to your body
    - Keeping your back straight
- Control the descent of the bar and return it to the starting position
- Repeat
- Bend knees and return bar to the ground

Squat (1/2 depth)

Equipment

- Weight bar (or similar object)
- Squat rack

Instructions

- Stand with your legs shoulder-width apart knees slightly bent. Hold the weight behind your neck, resting on your shoulders.
- Keeping your back straight, bend at the knees moving your hips back as if sitting down
    - ensure no arching of the lower back
    - Keep your eyes up looking straight ahead
    - ensure that your knees don't extend past your toes
- Squat should continue until your knees are close to 90 degrees
- Push through the legs and hips and return to the starting position
    - Ensure no arching of the lower back
    - Keep your eyes up looking straight ahead
- Return the bar to the rack

Phase 3: Heavy Strength / power phase

The heavy strength/power phase should aim to maximise power through appropriately supervised strength training. While many tasks in the PAT appear to have a major upper body strength focus, ensuring lower body strength and power will maximise your chances of success.

Progression to this phase should only be undertaken by those applicants who are physically capable of lifting heavy loads. Participation in this phase should be conducted under qualified supervision and will require some coaching regarding safe lifting techniques. Some exercises to consider in this phase could include:

Squats	Deadlifts	Cleans (hang and power)

Putting it all together

10 Week Training / Fitness Program

Phase 1

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	*Strength* _Core Strength _Strength program	*Active Rest:* _ Stretching	*Cardio Fitness* _Core Strength	*Active Rest:* _Stretching	*Strength* _Core Strength _Strength program	*Cardio Fitness* _Stretching	*Active Rest* _Stretching
Week 2	Strength _Core Strength _Strength program	Active Rest: _ Stretching	Cardio Fitness _Core Strength	Active Rest: _Stretching	Strength _Core Strength _Strength program	Cardio Fitness _Stretching	Active Rest _Stretching
Week 3	Strength _Core Strength _Strength program	Active Rest: _ Stretching	Cardio Fitness _Core Strength	Active Rest: _Stretching	Strength _Core Strength _Strength program	Cardio Fitness _Stretching	Cardio Fitness _Cross-Training
Week 4	Strength _Core Strength	Active Rest: _ Stretching	Cardio Fitness _Core Strength	Active Rest: _Stretching	Strength _Core Strength	Cardio Fitness _Stretching	Cardio Fitness _Cross-Training
	Recovery Week – Active rest and minimal strength/core work. Aim to feel fresh at the end of the week. Do not stop exercising completely.						

Phase 2:

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	*Strength* _Core Strength	*Active Rest:* _ Stretching	*Cardio Fitness* _Core Strength	*Active Rest:* _Stretching	*Strength* _Core Strength	*Cardio Fitness* _Stretching	*Active Rest* _Stretching
Week 2	Strength _Core Strength	Active Rest: _ Stretching	Cardio Fitness _Core Strength	Active Rest: _Stretching	Strength _Core Strength	Cardio Fitness _Stretching	Active Rest _Stretching
Week 3	Strength _Core Strength	Active Rest: _ Stretching	Cardio Fitness _Core Strength	Active Rest: _Stretching	Strength _Core Strength	Cardio Fitness _Stretching	Cardio Fitness _Cross-Training
Week 4	Strength _Core Strength	Cardio Fitness _Core Strength	Strength _Core Strength Cardio Fitness	Active Rest: _Stretching	Strength _Core Strength	Cardio Fitness _Stretching	Cardio Fitness _Cross-Training
	Recovery Week – Active rest and minimal strength/core work. Aim to feel fresh at the end of the week. Do not stop exercising completely.						

Following Phase 2, individuals may consider seeking professional advice regarding a strength/power program (Phase 3).