Recruitment Fitness

What do the physical sections of the recruitment process involve?

1. Fitness Test

Multi-Stage Shuttle Run/Bleep Test (as shown on video link)
This test measures cardiovascular fitness and maximum oxygen uptake (VO_2 max). The point of entry fitness requirement is 42.3 VO_2 which is equivalent to Level 8.6 on the Multi-Stage Shuttle Run/Bleep Test. The test is completed within 9 minutes of shuttle runs, which gradually increase in pace, over a 20 metre court. A warm-up and cool down is essential.

Chester Treadmill Test (as shown on video link)
This test measures cardiovascular fitness and maximum oxygen uptake (VO_2 max). The point of entry fitness requirement is 42.3 VO_2 which is equivalent to the 12 minute test. This is an incremental test incorporating seven levels where the gradient increases while the speed is set at 3.9mph (6.2km/hr). Participants are permitted to jog during the test if needed, however holding onto the treadmill during the test will result in the test being terminated.
The test procedure is as follows:

Level 1: 0-2 minutes at 0% gradient
Level 2: 2-4 minutes at 3% gradient
Level 3: 4-6 minutes at 6% gradient
Level 4: 6-8 minutes at 9% gradient
Level 5: 8-10 minutes at 12% gradient
Level 7: 10-12 minutes at 15% gradient
End of test

A warm-up and cool down is essential.

2. Practical Assessment Day (PAD) (as shown on video link)

Candidates will be allocated into groups and work around the following stations/tests in no particular order:

Ladder Climb
Ascend a 13.5m ladder, take a leg lock approximately half way up (put leg through gap in the rung into a secured locked position), release your hands, lean back and read a series of letters and numbers on the ground below, remove leg lock then ascend to the top of the ladder. Once instructed by the Trainer, descend ladder.

Casualty Evacuation
The casualty evacuation requires you to walk backwards (you will be guided by a safety officer) around 3 sides of a 10 metres square whilst dragging a 55 kg casualty. This is a test of your upper and lower body strength.

Ladder Lift
This lift is designed to assess your ability to replace the ladder onto the ladder gantry of a fire engine. You will lift a weight of 15kg to a height of 2m.

Ladder Extension

This is designed to assess your ability to extend a 10.5m ladder. You will haul a 35kg weight to a height of 8.2m in timed conditions.

Enclosed Space

This task assesses your agility in tight situations and also allows us to see how you cope in dark, claustrophobic situations. The first part of the test is completed with normal visibility; the second part of the test is completed in visually impaired conditions (lights off). You will be required to enter the crawling gallery wearing full fire kit and a mask to simulate wearing the breathing apparatus kit.

Equipment Carry Test (PAD Day)

The equipment carry test is essentially a shuttle test that will test your levels of aerobic endurance, muscular strength and muscular endurance. It is designed to replicate some of the physical demands involved in setting up a water relay station to supply water to a moorland fire. A brief detail of the test is shown below. The test is performed back and forth along a 25 metre shuttle whilst wearing full firefighter personal protective equipment (approx. 10 kg) and must be completed in 5 minutes and 8 seconds or less:

1. Run out the hose reel for 25 metres
3. Pick up and carry 2 x 70 mm hose (each weight approx 15 kg) for 100 metres
4. Hold one 70 mm hose at shoulder height and walk 25 metres (photo 3)
5. Walk/Jog/Run back 75 metres
6. Pick up and carry the 100 mm suction hose and basket (total weight approx 12 kg) for 100 metres
7. Walk/Jog/Run back 100 metres
8. Pick up and carry the pump simulator (total weight approx 33 kg) for 100 metres

(Total distance covered is 550 metres)

Hose Running

You will run out one length of hose, under-run it and then make it back up again. Then carry the length of hose at chest height back to start position; appox 25m. This test is designed to assess your ability to follow basic instruction and demonstrate an appropriate level of discipline and determination which are fundamental aspects to the firefighters role.

Strength Tests

Shoulder Press
35kg or more

Single Rope Pull Test
42kg or more

Repeated 28kg Pull Test at 35 reps/min
23 reps or more

This is not a pass or fail element, however competency on these strength based tests will be an indication of success throughout the recruit course.

How to improve strength

Well rounded strength is required to be a functional firefighter. A baseline of strength is required to perform the functional tasks outlined above. If you cannot achieve this, it is suggested that a strength programme will have to be undertaken, using the following guidelines (NSCA):

Sets	Repetitions	Intensity	Recovery
3-4	1-6	85-100%	2-3 minutes

If you already meet the required baseline of strength, a strength endurance programme should be undertaken. This will prepare you for the repeated bouts of exercise experienced throughout the recruits' course.

Sets	Repetitions	Intensity	Recovery
1-3	15-20	50-70%	30-60 seconds

Intensity is based upon one repetition at maximum mass for a specific exercise. For example, if an individual was to deadlift 100kg as a one rep max then 85% 1RM would be 85kg, 70% 1RM would be 70kg, 50% 1RM would be 50kg and so on.

Compound lifts (such as deadlift, squat, bench press) use multiple muscle groups at once and should form the basis of any strength training programme. Incorporating heavy compound lifts bring about an adaptation in power development. Whilst incorporating compound lifts such as deadlift and squat it is important to strengthen and protect the hamstrings. This can be done with the implementation of exercises such as Romanian Deadlifts, Nordics and Good Mornings.

Upper body strength is vital for being a successful firefighter. Example functional exercises could include:

Lat pull down

Shoulder press

Arnie curls

Tricep dip

Upright row

Seated row

Push ups

Grip strength can often be a limiting factor throughout the firefighter recruits course due to the nature of the equipment used and the repeated bouts of exercise. This can be often overlooked throughout training regimes; however in this role grip strength is of upmost importance. Improving this aspect of your strength will stand you in good stead throughout the course, example exercises could include:

Farmers Walks - using dumbells/kettlebells: choose a weight that will feel very heavy by the end of the set. Increase weight and distance covered to improve grip strength. This is also a compound exercise to incorporate into training focusing on traps, deltoid and core strength.

Plate grippers - using a plate that will feel very heavy by the end of the set, 20 reps each way, transfer plate only gripping with fingers.

Towel Supine Row/TRX row – using body weight complete 8-12 reps, keep body in a plank position with core tight. Using a thick towel (on a barbell) will challenge grip, increase difficulty placing feet on box/bench.

Farmers Walk

Plate Gripper

Supine Row

<u>Improving Fitness</u>

Elevated cardiorespiratory fitness is necessary to aid metabolic demands of the training, promoting faster recovery between exercises whilst also keeping you fit until the end of the training session.

Although moderate-intensity aerobic exercise (50%-70% HR_{max}) is advocated for health benefits, research suggests that higher-intensity aerobic exercise training may promote cardiovascular improvements to a greater extent.

High-intensity interval training (HIIT) is designed to improve endurance, increase anaerobic threshold, and improve maximal performance. This type of training has been shown to be effective at increasing aerobic capacity, improving endurance capacity (when working at 80% of aerobic capacity) and enhancing aerobic metabolism. This type of training also mimics the energy expenditure during an emergency; with this in mind alongside the effectiveness in cardiovascular adaptations it is beneficial to include HIIT in exercise prescriptions for firefighters. However it is necessary to be mindful that beginners and individuals with lower cardiovascular fitness to begin the programme at a lower intensity and progressively increase the intensity exposure.

HIIT training encompasses short, intermittent bouts of strenuous exercise promoting work rates at high intensity close to that of maximal heart rate. Rest periods should incorporate low intensity movements to allow for an active recovery, this will ensure no rapid drop in blood pressure or blood pooling which would result in the individual becoming faint.

Research suggests this method of training markedly improves VO_2 max capacity with the added benefit of being a prompt effective method in bringing about beneficial physiological adaptations in order to improve cardiovascular endurance, which is a key component in the success of a firefighter recruit.

Please note - in the event of you having an underlying health issue or concern you should consult with your GP before embarking on the programme. All exercise carries with it the risk of injury or illness and you undertake any exercise at your own risk. LFRS assume no responsibility for any injury or illness that may arise as a result of you undertaking any pre-course fitness programme.

Nutrition

Carbohydrates are an important energy supply with glycogen stores being drawn upon to sustain exercise. Maintaining an optimum level of carbohydrates throughout the course is critical as this can often be a limiting factor in performance. Research has shown that consuming carbohydrates, 100g of a high glycemic index, three to four hours before exercise is an effective method of improving performance. Ingesting smaller amounts of carbohydrates (ie 40g immediately prior and 10-15g every 15mins – perhaps in the form of a drink) prevents a fall in blood glucose and in turn delays fatigue. Carbohydrates are also an essential part of the recovery process as glycogen needs to be restored. The highest rates of glycogen synthesis occur within the first hour post exercise or if possible consuming smaller amounts of carbohydrate, around 20-30g, every thirty minutes post exercise is more efficient to restore glycogen due to sustained glucose and insulin availability.

Keeping hydrated as a firefighter is of upmost importance, this can improve performance and the ability to quickly recover from training sessions. Being well hydrated will improve motor function, decision making, concentration and enhances mental function which are all key aspects for success. It can be suggested to consume approximately 5-7mL/kg (of body mass) of fluids with sodium around four hours prior to a training session. Whilst also maintaining fluid intake throughout the day, ensuring urine is clear.

What do carbs look like?
1 large potato = approx. 55g carbs
1 medium bowl of oats = approx. 50g carbs
2 slices of bread = approx. 45g carbs
500ml sports drink = approx. 30g carbs

Glycemic Index

Low GI (<55), Medium GI (56-69) and High GI (70>)

Grains / Starchs		Vegetables		Fruits		Dairy		Proteins	
Rice Bran	27	Asparagus	15	Grapefruit	25	Low-Fat Yogurt	14	Peanuts	21
Bran Cereal	42	Broccoli	15	Apple	38	Plain Yogurt	14	Beans, Dried	40
Spaghetti	42	Celery	15	Peach	42	Whole Milk	27	Lentils	41
Corn, sweet	54	Cucumber	15	Orange	44	Soy Milk	30	Kidney Beans	41
Wild Rice	57	Lettuce	15	Grape	46	Fat-Free Milk	32	Split Peas	45
Sweet Potatoes	61	Peppers	15	Banana	54	Skim Milk	32	Lima Beans	46
White Rice	64	Spinach	15	Mango	56	Chocolate Milk	35	Chickpeas	47
Cous Cous	65	Tomatoes	15	Pineapple	66	Fruit Yogurt	36	Pinto Beans	55
Whole Wheat Bread	71	Chickpeas	33	Watermelon	72	Ice Cream	61	Black-Eyed Beans	59
Muesli	80	Cooked Carrots	39						
Baked Potatoes	85								
Oatmeal	87								
Taco Shells	97								
White Bread	100								
Bagel, White	103								

Ideas of Glycemic Index for a range of foods