



Gwasanaeth Tân ac Achub
Fire and Rescue Service

Firefighter Fitness Guide

Firefighter Fitness Guide

This document will guide you through your fitness preparation for the National Firefighter Selection Tests (NFST) and advise how you can maintain your fitness throughout your career.

Why Do Firefighters Need To Be Fit?

Being a firefighter involves responding to emergency situations and working closely with the local community to prevent fires happening in the first instance.

The work often involves responding to rapidly changing situations in different environments and weather conditions. This requires a range of skills including good communication, teamwork and a good level of physical fitness.

Prior to joining the service, it is vital you work to reach the required fitness standards, not only to pass the initial fitness tests but also to prepare your body to the physically demanding, and often unpredictable, role of a Firefighter.

Whether it's carrying heavy pieces of equipment over long periods of time, lifting a ladder overhead or travelling up several flights of stairs wearing breathing apparatus, the role of a Firefighter comes with many physical challenges. A firefighter's fitness levels are instantly put to the test when they don personal protective equipment (PPE) as this restricts movement, increases body temperature through preventing heat from entering and escaping the body, making it more challenging to recover from bouts of activity.

There are 3 main areas of fitness training that are vital to develop and maintain to become an effective Firefighter;

- **Strength/Resistance** – lifting/carrying equipment, running out hose, lifting ladders, holding equipment for extended period of time e.g. car cutting tools.
- **Cardiovascular** – the capacity of the heart, lungs and circulation to work for extended time in stressful conditions. Activities with greater needs include climbing ladders, walking up staircases, using breathing apparatus and holding equipment for prolonged periods of time.
- **Agility (including Balance & Flexibility)** – Working on unstable ground, in dark, confined spaces.

North Wales Fire and Rescue Service is committed to providing everyone with an opportunity to improve and maintain their fitness levels in order to serve the community. You can contact one of the Health, Fitness and Wellbeing Advisers with any queries on the following email; fitness.wellbeing@northwalesfire.gov.wales.

Safety Notice

Your safety is paramount whilst training for and during the National Firefighter Selection Tests (NFST). Full PPE and a safety brief will be given on the day of the NFST. More information will be provided on the NFST further on in this guidance.

It is important that you consult with your doctor prior to undertaking any form of physical exertion or if you have any medical conditions which may put you at risk, you should seek professional medical advice. If you answer any of the questions below with a 'YES' or if you have any worries about completing a physical training program, then consult your GP or a relevant professional before starting.

YES	NO	
		1. Has your doctor ever said you have a heart condition <u>and</u> that you should only do physical activity recommended by a doctor?
		2. Do you feel pain in your chest when you do physical activity?
		3. In the past month, have you had chest pain when you were not doing physical activity?
		4. Do you lose your balance because of dizziness or do you ever lose consciousness?
		5. Do you have a bone or joint problem that could be made worse by a change in your physical activity?
		6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
		7. Do you know of any other reason why you should not do physical activity?

A suitable warm up should be carried out prior to undertaking any form of physical activity. Ensuring the heart rate is elevated and the joints loosened appropriately. Below is the minimum requirement to warm up the body, if you do not feel warmed up please repeat below;

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PREVENTING PROTECTING RESPONDING


FIREFIGHTER GENERIC WARM UP ROUTINE

Aim: The main purpose of the warm up is to direct blood flow to working muscles and to increase body temperature to the point of light sweating.


Please note this is a minimum requirement to warm up the body, and therefore you may have other areas which you may wish to focus on before commencing a drill. If you do not feel warmed up and ready to undertake a drill please repeat.

Time: At least 5 minutes


Activity (approximately 30 seconds each)




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30 seconds Jogging on the spot or around the yard




Stationary arm circling 10 forward / 10 backwards




30 seconds of heel flicks




30 secs high knees



Squats 30 seconds



Alternative lunges 30 seconds



Stationary leg swings (approx 30 seconds)



Fitness Standards

Aerobic Capacity

Aerobic capacity is the maximum amount of oxygen that can be taken in, transported and used in the body. It is an indication of the ability of the lungs, cardiovascular system and muscles to deliver and use that oxygen for energy.

The aerobic fitness standard for UK firefighting is 42.3mls oxygen per kg of body weight, which is your VO2max. Aerobic capacity is a measure of stamina, endurance or cardiorespiratory fitness. In general, the higher your aerobic capacity the fitter you are.

Aerobic fitness is considered to be a measure of health-related fitness for two main reasons:

1. Low levels of aerobic fitness have been associated with premature death, especially from cardiovascular disease.
2. Increased aerobic fitness is linked to greater levels of physical activity, which in turn has many health benefits.

To measure your aerobic fitness the Chester Treadmill Test will give you an accurate indication of your current ability. Use the following QR code or URL to view a short video of this fitness assessment: [Bit.ly/treadmillNWFRS](https://bit.ly/treadmillNWFRS)



The Chester Treadmill Walk Test

Constant speed of 6.2 kph / 3.9 mph. No running, must walk throughout without holding on.

GRADIENT	TIME	VO2max (mls.kg.min)
0%	0 – 2 minutes	–
3%	2 – 4 minutes	19
6%	4 – 6 minutes	25
9%	6 – 8 minutes	31
12%	8 – 10 minutes	36
15%	10 – 12 minutes	42.3

To achieve 42.3ml.kg.min the participant **must** achieve **12 minutes**. This is the required aerobic capacity for UK firefighting.

Ensure Rate of Perceived Exertion (RPE) stays below 18 throughout. RPE relates to how hard you feel you are working and equates roughly to your heart rate. See the following table.

BORG SCALE	RPE	ESTIMATED HEART RATE
6	Very, very light	60 BPM
8	Very light	80 BPM
10	Light	100 BPM
12	Somewhat hard	120 BPM
14	Hard	140 BPM
16	Very hard	160 BPM
18	Very, very hard	180 BPM
20	Maximal exertion	200 BPM

Muscular Strength

There is no standardised fitness test for muscular strength as of yet, however you are required to demonstrate your strength ability during the NFST.

To improve overall muscular strength, it is advised that individuals train the body as a whole with multi-joint, compound lifts such as Squats, Deadlifts and Overhead Presses. These will improve the functional strength of the body by working on multiple muscles which help stabilize joints through the movement rather than just isolating certain muscles. Compound moves will also target your deep core muscles, providing a stronger base to produce more power as well as prevent injury. Ladder Lift Test – This requires individuals to lift a bar from waist height to above the head passing a marker set at 1.9m. The first lift is approximately 20kg and the second being 30kg.



Grip Strength

Another key area which is required for firefighter fitness is having an adequate grip strength as you are required to carry heavy equipment for prolonged periods of time. The standards for this are 35kg in your dominant hand and 33kg in your non-dominant hand. This will be tested at the medical stage of the recruitment process using a grip dynamometer.



Muscular Endurance

Muscular endurance is the ability to continue contracting a muscle, or group of muscles, against resistance over a period of time. Whilst the role of a firefighter requires individuals to be physically strong they also need to have the capacity to perform repetitive movements and hold static positions for prolonged durations. There is no standardised fitness test for muscular endurance, instead the NFST Equipment Carry provides a realistic measure to assess this ability in the firefighter setting.

Test Your Current Fitness Levels

Before you start your training, it is advisable to know your starting point and work out your baseline fitness. This will allow you to tailor your training, monitor your progress and reduce the likelihood of injury.

It is really important to thoroughly warm up and not rush through your session too quickly.

Use the following as a guide to determining your current fitness levels, then re-test every few weeks of your training to monitor progress. Even if you start or hit the following standards it is still advisable to continue your training as these are likely to be only be the minimal level required to be a competent firefighter.

You are likely to have the minimum level of aerobic fitness for UK firefighting if you can:

- Run 1.5 miles (2.4 kilometres) continuously in 12 minutes or less (this is equal to running 6 laps of a 400m outdoor athletics track).
- Run on a treadmill at 7.5 mph (12 km/h) for 12 minutes.
- Perform the multi-stage shuttle run test (bleep test) to at least level 8 shuttle 8. You can get the 20m bleep test audio for free on Spotify.
- Achieve 12 minutes on the Chester Treadmill Test

You are likely to have the minimum level of muscular strength for UK firefighting if you can:

- Shoulder press 35 kg once in an overhead, upright seated position.
- Rope pull 28 kg of static weight 23 times without rest from a seated position.
- Rope pull 60 kg of static weight once from a seated position.



National Firefighter Selection Tests (NFST)

During the recruitment process you may be invited to a selection day in which you will be required to complete 6 National Firefighter Selection Tests.

The NFST have been designed to reflect some of the tasks that a firefighter performs. They will test the potential of an individual to undertake these tasks when fulfilling the role of a firefighter. The 6 tests are:

Ladder Lift

This is a test of upper body strength. You will drag the bar to chest height, change your grip and then shoulder press the bar above the head, making sure it passes the 1.9m mark. After a warm up lift of 20 kilograms, you'll need to lift an approximate weight of 30 kilograms.



Equipment Carry

As the name suggests, you'll need to carry a range of equipment typically found on a fire engine within a specified time. This test will include a double hose carry, barbell carry, controlling an extendable hose, all in fire kit. This tests your aerobic fitness, strength and endurance.



Confined Spaces

Testing your agility and ability to work in a small space and follow instructions. Wearing a breathing apparatus facemask, you will crawl around half of an enclosed route with clear vision. An instructor will then obscure your vision, before you return to the start to complete the course within a set time.



Ladder Climb

The Ladder Climb will build your confidence of working at height. To pass, you'll need to demonstrate a correct leg lock whilst at height (which will be taught by instructors). This means locking your leg through the ladder and leaning back with arms outstretched before identifying a symbol shown on the ground below you.



Casualty Evacuation

Using both your upper and lower body strength, you'll need to walk backwards while dragging a 55 kilogram dummy around a 30 metre course in a set amount of time.



Manual Dexterity

Against the clock, you will assemble and disassemble a piece of firefighting equipment using pictorial and written instructions.

These tests are performed in a controlled environment and should not be attempted without the appropriate instruction or supervision. All applicants wanting to become a firefighter have to pass a fitness test to demonstrate they can manage the physical demands of the job. Regardless of your gender, age or lifestyle, the NSFT tests are the same for everyone. 'There is no such thing as a typical firefighter'.



Program Guidance

In order to help you prepare for the selection tests and future demands of firefighting the following programs have been developed.

These 6 week training programs are designed to give you a structured plan that will best prepare you for the unique and varied nature that the role of a Firefighter involves.

These are primarily aimed at people with a beginner/intermediate level of fitness and with access to a well equipped gym, although we have tried to limit the equipment needed in program 2 to make it as accessible as possible.

Aim to complete these programs 3 times a week (2 x program 1; 1 x program 2). Continue with other types of training alongside these workouts such as further CV and flexibility sessions. Further information regarding types of suitable CV sessions can be found below. This plan is designed for the general population with no injuries/restrictions so it is your responsibility to make appropriate adjustments to ensure your own health & safety.

This will benefit you through improving your range of motion, reducing your chance of injury and getting the most out of your plan. For further information on this please subscribe to our [Youtube channel](#).

Please check with your GP before starting any new exercise regime.



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Name:






Date Started:

Duration:

Aims/Objectives: To improve muscular strength, endurance and aerobic

capacity, to achieve the required standard to be a competent firefighter.

Program: 1 (Gym)

Exercise	Sets x Reps / Rest	1	2	3	4	5	6	Link to exercises / QR Code
1. Strength A. DB/BB Romanian DL (3s lower, 1s up) B. DB High Pull	12/10/8/8 90s rest between sets							 
2. Endurance A. Walking Lunge Rot B. Deadbug C. Farmers Carry (1 min) D. Seated Shoulder Press	3 x 12 reps / 2 min rest							  
3. Aerobic conditioning CV Machine	6-10 mins 35s:25s							35s hard effort followed by 25s rest for 6-10 minutes on any CV machine

NOTES – Please warm up for 5 mins and Cool down for at least 3 mins. See QR Codes below. Record Weights used or distance etc achieved in the box each week. For any help with the program please email fitness.wellbeing@northwalesfire.gov.wales





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Name:











Date Started:

Duration:

Aims/Objectives: To improve muscular strength, endurance and aerobic

Program: 2 (Limited Kit)

capacity, to achieve the required standard of fitness to pass
the selection tests

Exercise	Sets x Reps / Rest	1	2	3	4	5	6	Link to exercises / QR Code
1. Strength (Slow tempo) A. Weighted Squat B. Press up C. RB Reverse Fly	12/10/8/8 reps / 90s rest							  
2. Endurance A. Lunges B. RB Squat to Press C. RB Tricep Kickback	3 x 16 reps / 60s rest							  
2. Aerobic / Core conditioning A. Arms OH Jogging B. Stepping C. S.Plank Rotations D. Mountain Climbers	20 reps As many rounds as possible in 6-10 mins							   

NOTES – Please warm up for 5 mins and Cool down for at least 3 mins. See QR Codes below. Record Weights used or distance etc achieved in the box each week. For any help with the program please email fitness.wellbeing@northwalesfire.gov.wales.

Please use the following link to view an appropriate resistance band [Phoenix Fitness Light Green Resistance Tube Band with Handle to Use with Legs or Bar - Resistance Tube for Exercise Fitness Workout Routines - Gym or Home Toning Strength Training](https://www.phoenixfitness.co.uk/green-resistance-tube-band-with-handle-to-use-with-legs-or-bar-resistance-tube-for-exercise-fitness-workout-routines-gym-or-home-toning-strength-training) : [Amazon.co.uk: Sports & Outdoors](https://www.amazon.co.uk/Sports-Outdoors)



Cardio Training

Use these three cardiovascular (CV) techniques to vary your approach to exercise and maximise your fitness potential:

LISS – low intensity steady state cardio; LISS is ideal for an active rest or recovery day for those who have higher intensity workouts as a part of their everyday routine. The risk of injury is also significantly lower. This can be done from doing any form of cardio (running, rowing, cycling, skipping, cross trainer, stair climbs, Jacobs ladder).

HIIT – high intensity interval training which really gets the heart rate close to its maximum and allows the body to burn calories for up to 2 hours after the cardio session has finished. This form of cardio can be completed in many different ways (hill sprints, rowing, cycling, bodyweight circuit, running reps between lampposts).

Fartlek – this is Swedish for ‘Speed play.’ This form of cardio is done by randomly changing the intensity of the training, for example, on the running machine (treadmill), you do a 5 minute warm up, then increase the speed to a high intensity and hold it for 1 minute, then slow it right down to an easy jog/fast walk for 2 minutes, then up the speed to a moderate pace for 3 minutes, creating a random pattern which the body has to adapt to.

Progressing Strength

When following the programs, it's important to challenge the body in order to make the necessary progressions.

Starting the program

Initially, find a weight which you can comfortably complete the required amount of repetitions. For example using a 10kg plate for a squat. From here gradually increase the weight until you find one which challenges you to complete all the required repetitions.

From here gradually increase the weight until you find one which challenges you to complete the required repetitions.

You should be able to complete the reps with good form but the last 3 reps should feel a challenge. This is your starting weight so write it down on the plan.

Each week, challenge yourself to make small increases if possible.

As mentioned previously to develop strength it is advisable to train the body with big multi-joint exercises. These will improve the functional strength of the body as a whole and also improve core stability and power. Feel free to isolate certain muscle groups you may feel you are weaker on than others, but these exercises should be performed at the end of the sessions.

Other ways to progress

Please do **not** perform any exercises if you do not know how to correctly perform them. **Always** ask a fitness professional for support if undertaking your 1 rep max.

Other techniques for progressions can be:

- Increase sets – add in another set on to your chosen exercises.
- Increase time under tension – add 5 seconds on to the time your muscles are being worked.
- Super set – complete 2 different exercises back to back, removing the usual rest time between sets.
- Tri/Giant set – this method aims at completing 3 or more exercises back to back before your scheduled rest, this method can be very strenuous.
- Drop set – once you have completed your set, the weight will immediately be reduced, where you will be required to complete the set again, repeat this process between 3–6 times or until failure is reached.
- Pyramid sets – pyramid training is performing an exercise or two, for a particular rep and then working your way down to 1, intended to fatigue the muscle. This type of training can be employed as an upward or downward sequence in weight or reps.

Following your session

It is important to cool down following your training session to allow a gradual recovery of pre-exercise heart rate and blood pressure. A good stretching routine may also reduce the risk of injury through muscle and tendon tightness. For a full cool down and stretching session please scan the Barcode or use the generic guide below.



Maintaining Your Fitness

To ensure health and safety is maintained to required standards it is important that all firefighters take responsibility for their training and development. The same is true for their physical fitness. This guide has already highlighted the importance of being physical strong and that aerobic fitness is needed to sustain activities for prolonged durations. Firefighters need to participate in regular exercise to maintain those standards throughout their careers.

As a guide, for maintaining muscular strength and endurance it is important to stimulate a muscle group at least every 72 hours. For maintenance of aerobic fitness aim to complete 2–3 cardio workouts each week.

Regular exercise is scientifically proven to benefit mental health as well. Through creating an exercise regime you will release ‘feel-good’ hormones (endorphins) benefitting your mind and prepare you for the annual health and fitness review.

Other fitness practices such as stretching and core training are also beneficial as these will help prevent injuries, build a stronger core for increased stability and correct postural imbalances.

For any further help or advice regarding your health and fitness please speak to one of our service’ health, fitness and wellbeing advisers. You can contact them at fitness.wellbeing@northwalesfire.gov.wales

If you require this document in an alternative language or format then please contact fitness.wellbeing@northwalesfire.org.wales