

Medical Examination Protocol for Firefighters

1. Vision

Monocular vision is likely to be disqualifying. See Exhibit A to the Firefighter protocol, which outlines the essential functions of the position.

Far Acuity:

20/30 or better each eye corrected or uncorrected.

Uncorrected, but normally uses Glasses:

20/100 or better each eye.

Uncorrected, but normally uses Hard Contact Lenses:

20/100 or better each eye.

Uncorrected, but normally uses Soft Contact Lenses:

Successful wearers of soft contact lenses (defined as six months without a problem) are not subject to the uncorrected standard.

Peripheral Vision:

$\geq 70^\circ$ temporal visual field in each eye in the horizontal plane

AND

$\geq 140^\circ$ binocular visual field in the horizontal plane

Assess by a vision-testing machine or with confrontational fields.

Color Vision:

All candidates should be tested with pseudoisochromatic plates, such as the Ishihara test. If the candidate fails this test, the Farnsworth D-15 should be administered. Those who fail the Farnsworth D-15 should be restricted from all field duties requiring color identification and discrimination such as HAZMAT team duty.

History of Radial Keratotomy Surgery:

Post-op records must be submitted for review, there must be no impairing difficulty with glare or night vision, no significant diurnal instability in visual testing or function, and no indication that uncorrected far acuity will be significantly degraded within the next 2-3 years by progressive hyperopia. Candidate must obtain a statement from their ophthalmologist attesting to the above. A minimum deferral period of 6 months is required for candidates less than 35 years old, or 12 months for those 35 years of age and older.

History of Lasik Surgery:

Post-op records must be submitted for review, there must be no impairing difficulty with glare or night vision, no significant diurnal instability in visual testing or function, and no indication that uncorrected far acuity will be significantly degraded within the next 2-3 years by progressive hyperopia. Candidate must obtain a statement from their ophthalmologist attesting to the above. A minimum deferral period of 4 weeks is required for all candidates.

2. Hearing

Hearing Acuity:

Pass if:

≤ 25 dB loss in 3 of 4 frequencies (500, 1000, 2000, 3000 Hz)

OR

≤ 30 dB loss in any one of three frequencies (500, 1000, 2000 Hz)

AND

Averages loss ≤ 30 dB for the four frequencies 500, 1000, 2000, and 3000 Hz.

AND

Does not have a Category B condition: (A medical condition that, based on its severity or degree, could preclude a person from performing as a member in a training or emergency operational environment by presenting a significant risk to the safety and health of the person or others.) Category B conditions must be evaluated on a case by case basis in conjunction with the sponsoring department to establish if the candidate can successfully fulfill the essential functions of the position. See Exhibit A to the Firefighter protocol, which outlines the essential functions of the position.

1. Hearing outside the above parameters
2. Unequal hearing loss
3. Atresia, severe stenosis, or tumor of the auditory canal
4. Severe external otitis
5. Severe agenesis or traumatic deformity of the auricle
6. Severe mastoiditis or surgical deformity of the mastoid
7. Meniere's syndrome or labyrinthitis
8. Otitis media
9. Any other ear condition that results in a person not being able to perform as a member and results in a person being unable to pass a job-specific functional hearing task test or a hearing in noise test.

3. Cardiovascular Testing

Candidates must achieve a level of 12 METS on the treadmill with no evidence of ischemia, arrhythmias, or other cardiovascular conditions that may interfere with the safe performance of a firefighter's job duties.

4. Hypertension

A. Pass if:

BP $\leq 140/90$ with or without medication

AND

No evidence of end-organ damage

Urinalysis and renal function test abnormalities, history of hypertensive cerebrovascular damage, congestive heart failure, evidence of left ventricular hypertrophy, or hypertensive abnormalities of optic fundus.

B. Else if:

Systolic ("SBP") 141-160 (inclusive) with or without medication

OR

Diastolic ("DBP") 91-105 (inclusive) with or without medication

AND

No evidence of end organ damage:

Urinalysis and renal function test abnormalities, history of hypertensive cerebrovascular damage, congestive heart failure, evidence of left ventricular hypertrophy, or hypertensive abnormalities of optic fundus.

THEN

Perform further evaluation and PASS if BP response on treadmill test demonstrates:

SBP < 200 AND DBP < 100

AND

Increase in DBP < 10

ELSE

Restrict from job tasks requiring 12 METs of activity.

C. Likely to be disqualified if:

DBP > 105 with or without medication

OR

SBP > 160 with or without medication.

OR

Evidence of end-organ damage.

Urinalysis and renal function test abnormalities, history of hypertensive cerebrovascular damage, congestive heart failure, evidence of left ventricular hypertrophy, or hypertensive abnormalities of optic fundus.

See Exhibit A to the Firefighter protocol, which outlines the essential functions of the position.

5. Diabetes

A. General rules and guidelines

1. If there is evidence of active proliferative retinopathy, vitreous hemorrhages, or macular edema of pre-proliferative retinopathy, the candidate should not be cleared until the condition has stabilized and can be further evaluated.
2. The presence of microaneurysm, exudates, or other findings of background retinopathy during the eye examination is not, in and of itself, sufficient grounds for disqualification unless visual acuity is affected and prevents the candidate from meeting current agency vision standards.
3. Any candidate who has experienced ANY serious episodes of hypoglycemia (serious episodes are any episodes requiring the assistance of others) within the past 5 years, or who has evidence of autonomic dysfunction (i.e., abnormal neurologic examination, abnormal R-R variation on ECG with valsalva; any indication of significant neuropathy based on sensory testing using nylon monofilament should be carefully evaluated), should be disqualified from further consideration. Such individuals would present a direct threat to themselves or others.
4. A vision examination by an ophthalmologist documenting the absence of clinically significant eye disease is required of all candidates.
5. If medically cleared, candidate submit clearance from an ophthalmologist based on annual ophthalmologic examinations that check for onset of clinically significant eye disease, color vision deficiency and acuity changes.

6. Candidates who use an insulin pump should be outfitted with a departmental uniform, including all required equipment to ensure that the pump's effectiveness is not compromised.

B. Non-insulin dependent diabetics (NIDDM): If controlled with diet and exercise alone, no restrictions. If Hemoglobin A-1C levels are abnormal by local laboratory standards, the candidate should be deferred until evaluation, treatment, and control of diabetes can be documented for at least 6 months.

C. NIDDM: if controlled by diet and oral medication, glucose levels should be monitored and documented 4 times per day (before breakfast and one hour after each meal) for a minimum of 3 times per week for at least 3 months. The candidate must agree to maintain testing at least 1 time per week during employment. If the test results are satisfactory and the candidate agrees to ongoing testing, the candidate may be qualified. However, if Hemoglobin A-1C levels are abnormal by local laboratory standards, the candidate should be deferred until evaluation, treatment, and control of diabetes can be documented for at least 6 months.

D. Insulin-dependent diabetics (IDDM):

Phase I:

1. Candidate must submit medical records documenting their care and control over the past 5 years
2. Insulin requirements may dramatically change during the first 18-24 months after initial diagnosis. Therefore, candidates in this situation must submit medical records documenting their care and control over a period of 24 months or the duration of their diabetes mellitus, whichever is greater. Candidates who have not had diabetes mellitus for at least 24 months must wait to apply in order to establish sufficient data to allow reasonable assessment of their condition.
3. Verification from candidate's physician(s) that there have been no serious episodes of hypoglycemia over the past five years (i.e., episodes requiring the assistance of others). The physician must also attest to the absence of other problems or poor control that may not have been reflected in the written history. The physician may also be required to approve in writing the ability of the candidate to perform any agency-specific job demands, such as working swing shifts, night shifts, or being on-call for extended time periods.
4. Medical records must also indicate that the candidate is free of any autonomic dysfunction (i.e., abnormal neurologic examination, abnormal R-R variation on ECG with valsalva; any indication of significant neuropathy based on sensory testing using nylon monofilament should be carefully evaluated). If this information is not available from the records, the applicant will need to obtain this information by referral from his/her treating physician.
5. Vision testing by an ophthalmologist documenting the absence of clinically significant eye disease should be required of all candidates.

Phase II: If candidate passes the above, they can then enter the blood glucose control phase.

1. Candidate must maintain diary listings of their blood glucose levels for a period of at least six months. Glucose levels should be determined frequently during this time (4 times per day—before each meal and at bedtime—and as needed). Also, candidates must record other relevant information, such as medications taken, dietary intake out of the ordinary, descriptions of the type and amount of activity, as well as any unusual conditions affecting blood glucose control.
2. Only candidates whose diaries indicate adequate blood glucose compliance and control—defined as maintaining blood glucose levels between 100-300, with no instances of serious hypoglycemia or other behavioral/cognitive impairment—should continue on in the medical evaluation process.

Phase III: Insulin infusion testing.

1. This testing should be conducted at a university or specialty laboratory by an endocrinologist experienced with this testing procedure.
2. The testing should be conducted using an accepted protocol, such as that outlined in an article by White et al in the March 3, 1983 New England Journal of Medicine (Vol. 308, No. 9, pg. 485-491).
3. Assessments of cognitive functioning and related physical symptoms, as well as awareness of one's blood glucose level, should be conducted when blood glucose level descends below 100. The specific blood level corresponding to onset of impairment should also be noted, as well as the candidate's glucagons and epinephrine response to hypoglycemia. Only candidates whose test results indicate a normal glucose response and an appropriate epinephrine secretory response (if glucose response is normal, measurement of epinephrine is not necessary) and no evidence of cognitive impairment when glucose is above 60 should continue in the medical evaluation process. A table is provided that has the behavioral assessment criteria that should be used during testing.

Phase IV: Job-related testing.

1. Should be conducted by the agency's screening physician or agent
2. Can be conducted during one 8-hour time period, or it may be administered over several days to better simulate the specific working conditions faced at that agency (e.g., shift work) to assess the candidate under a greater variety of situations (e.g., interruption of meal on one day but not the others).
3. Inform candidate that test will involve being asked to run on a treadmill for seven minutes (two minutes to accelerate pulse and five minutes of exercising at a pulse of between 75-90% x 220 – age) at random intervals throughout the day. No forewarning and no time to ingest any substance during the seven minutes of running are provided. After the run, the candidate will be required to walk for 25-30 minutes, during which time she/he is allowed to ingest lifesavers or other substance as desired, then an officer could be expected to easily carry on oneself while on duty.
4. Inform candidate that the purpose of this test is to ensure that they can maintain their blood glucose levels within 100-300 throughout all phases of testing. Candidates should be required to bring their own glucose meters and reagent strips, medication, and any food desired during the testing period. They should be informed that periodic glucose measurements will be taken by the test administrator and that these readings will be sent to a laboratory for analysis; therefore, it would be prudent to ensure that their personal glucose meter is properly calibrated.
5. The candidate's blood glucose levels and visual acuity levels should be measured at the beginning of the test and several times throughout the 8-hour testing process. Any blood glucose reading that is below 60, or any reading over 350 indicates that the candidate could demonstrate insufficient blood glucose control during critical firefighting circumstances and events, and is therefore a failed test. Successful completion of this test also requires that the individual's visual acuity remain within agency standards at all times during the testing.
6. If approved for duty, the candidate must agree to remain under an endocrinologist's care, maintaining quarterly scheduled appointments. Regular, ongoing blood glucose monitoring should involve, at a minimum, use of a One-Touch II or equivalent device within 1/2 hour prior to assuming work duties, and approximately every 2 hours while on pay status. Blood glucose levels outside of the 100-300 range requires notification of one's supervisor and cessation of all work duties that have public health and safety implications.

7. In order to formalize their obligation to comply with these maintenance procedures, it is recommended that candidates sign a preplacement agreement.
8. Testing should be conducted for signs of the onset of autonomic neuropathy prior to the end of the probationary period, at five year intervals thereafter for officers who have had diabetes for ten years or less, and at 2 year intervals for those who have had over ten years of experience with the condition.