



Occupational Visual Standards

Introduction

'When a doctor arrives to attend some patient of the working class he ought not to feel his pulse the moment he enters, as is nearly always done without regard to the circumstances of the man who lies sick ... I may venture to add one more question: What occupation does he follow?' (1).

Many occupations require people to have particular levels of vision to be able to operate effectively and safely. These requirements are known collectively as occupational visual standards.

Some work requires high levels of visual function, such as in watch making, or where there is an element of danger and third party risk such as piloting an aircraft, performing microsurgery, or working with heavy moving machinery. The train driver must have normal colour perception in order to safely interpret coloured signals, as must an electrician, yet this may be quite unimportant in other lines of work.

Recruitment and workforce management decisions may depend on the ability of workers to meet the visual standard for a particular occupation. Ophthalmologists may be called to provide reports or liaise with employers, occupational health professionals and insurance companies. This may be at the pre-employment screening stage, or when existing employees develop ophthalmic problems that may question their visual fitness for work. For these reasons, it is important that today's ophthalmologist is familiar with contemporary occupational visual standards.

Visual standards for military personnel are beyond the scope of this guidance material.



Professional aviation

The Civil Aviation Authority (CAA) is the UK's regulator for aviation, and the CAA's Medical Division (2) applies the visual standards for professional pilots, Air Traffic Control Officers (ATCO's) and ground based aerodrome personnel, such as aerodrome firefighters and airside drivers.

Professional pilots

For professional pilots, medical fitness standards are issued by the Joint Aviation Authorities (JAA) in Europe (3), and are then applied by the UK CAA. All pilots who fly for hire and reward, for both airplanes and helicopters, are required to hold a medical certificate known as the JAA Class 1 certificate. This is required for both professional pilots in their initial training, and for existing qualified pilots to maintain the privileges of their JAA licences. Specific visual standards are required to be met, to obtain and revalidate/ renew the JAA Class 1 medical certificate.

Visual standards for JAA Class 1

All new applicants for a Class 1 licence must meet the following ophthalmological requirements:

- No abnormality of the function of the eyes or their adnexa, or any active pathological condition, congenital or acquired, acute or chronic, or any sequelae of eye surgery or trauma, which is likely to interfere with the safe exercise of the privileges of the licence.
- A routine eye examination will form part of all re-validation and renewal examinations.
- Distance vision, with or without correction, must be 6/9 or better monocularly, and 6/6 or better binocularly.
- The refractive error must not exceed +5.00 to -6.00 dioptres along the most ametropic meridian, with no more than 2.00 dioptres of astigmatism and no more than 2.00 dioptres of anisometropia.
- Some professional pilots who wear spectacles (or contact lenses) are required to have regular eye examinations. They are; for refractive errors in the range +3.00 - +5.00 and -3.00 - -6.00, every 5 years, and for refractive errors greater than -6.00, astigmatism of 3.00 dioptres or more and anisometropia of 3.00 dioptres or more every 2 years.
- If the visual requirement is met only with the use of correction, the spectacles or contact lenses must provide optimal visual function and should be suitable for aviation purposes.



Ophthalmic Services Guidance

- Near vision of N5 at 30-50cms and N14 at 100cms with correction if prescribed.
- Normal binocular vision. Heterophorias exceeding 10Δ esophoria, 8Δ exophoria, 2Δ hyperphoria at distance or 8Δ esophoria, 12Δ exophoria, 1Δ hyperphoria at near must be assessed by a specialist.
- Normal convergence.
- Normal visual fields.
- Normal colour perception (defined as no mistakes on Ishihara plates). Applicants who fail the Ishihara test will be assessed as colour safe if they pass an alternative approved advanced colour perception test which include the Holmes-Wright or Beyne Lantern, anomaloscope, spectrolux or the computerized Colour Assessment and Diagnosis (CAD) test.

Spectacles

Any spectacles necessary must be 'available for immediate use', and so there is no time to take them on or off. An applicant who needs a correction to meet the near visual acuity will require 'look-over', or multifocal lenses in order to read the instruments and a manual held in the hand, and also to make use of distance vision through the windscreen without removing the lenses. The CAA accepts all forms of spectacle correction except that of a single vision 'full field' lens for near.

An applicant is expected to advise the optometrist of relevant reading distances for the flight deck. The occupational needs may then be fulfilled by bifocal, trifocal or varifocal lenses. On occasions an intermediate correction in the upper field may be required, which may be accomplished by a segment of the relevant power in addition to the bifocal or varifocal design. Flip-up spectacles are also acceptable.

Sunglasses may often be required and their use is encouraged. Tints should be neutral grey, but polarised lenses and photochromic lenses are discouraged. An additional pair of untinted spectacles must be carried.

Contact Lenses

Contact lenses may be worn by a professional pilot (but not to correct near vision). If contact lenses are worn, applicants should bring a report from an optometrist to their initial Class 1 medical examination, which includes the following:

- The contact lens specification and corrected visual acuity;
- Confirmation that the contact lenses have been worn constantly and successfully for at least eight hours a day over a period of at least one month.

All gas permeable and hard contact lenses must be removed at least 48 hours before the initial Class 1 medical examination, but must be taken to the examination. Multifocal



Ophthalmic Services Guidance

contact lenses, orthokeratology or monovision correction are not acceptable for JAA Class 1 certification.

Refractive Surgery

The CAA does not recommend refractive surgery to gain a medical certificate to fly. The certification limits of refractive correction and the limits of refraction before surgery are the same, so it is not possible to gain a medical certificate by having refractive surgery that it would not have been possible to obtain before surgery. However, for an applicant who has had refractive surgery, Class 1 certification will be considered three months after LASIK provided an assessment, including refraction, has been carried out at two months post-operatively. Certification can be considered six months after LASEK/PRK for myopia, provided an assessment has been carried out three months post-operatively.

Please note that:

The pre-operative refraction should not have been more than + 5.00 to -6 dioptres
Stability of refraction must be achieved. To show this, applicants will need to obtain a report showing their refraction about a month before visiting the Centre.
There must have no problems with glare

Cataract surgery

Cataract surgery entails unfitness for initial applicants. For existing licence holders, however, a fit assessment is possible depending on a report from the attending ophthalmologist confirming that:

- A minimum of 6 weeks has passed post-surgery
- Near and distant VA standards are met, with best optical correction
- There are no post-operative complications and the pilot has recovered fully from the surgery
- There is no significant photophobia, night-glare, anisometropia, asthenopia or diplopia

Retinal surgery and glaucoma surgery

These are not compatible with holding a JAA Class 1 medical certificate, and initial applicants with a history of such will be refused. For cases of existing licence holders should, the CAA medical department should be contacted for further information



Air Traffic Control Officers (ATCO's)

ATCO visual standards are similar to that for professional pilots, with some subtle differences. The regulatory body for ATCO's is the National Air Traffic Control Service (NATS) (4), but medical certification is overseen by the UK CAA. The following are the current published visual requirements:

- Candidates must have normal colour vision.
- Visual acuity must be 6/9 or better in each eye.
- Refractive correction must not exceed +3.00 or – 3.00 dioptres spherical error in each eye.
- Cylindrical correction shall not exceed 2 dioptres in each eye; anisometropia shall not exceed 2 dioptres.
- For applicants aged 26 and over, the correction allowed will be considered on an individual basis. It must not exceed standards set by the Civil Aviation Authority (CAA).

Eye surgery

If applicants have had any form of eye surgery, to include, squint correction, laser visual correction, even if the pre-operative correction is within the NATS acceptable range, applicants will be referred to a specialist appointed by NATS for further examination.

Pre-operative refractive corrections outside of the stated NATS eyesight limit, but within the CAA limits (+5.00 and -6.00), will be considered on a one to one basis.

Non-Pilot Flight Crew (Flight Engineers, Flight Navigators)

The visual requirements are generally the same as for JAR Class 1 certification:

Other Occupations

Airfield fire crew

The following minimum standards apply:

- Distance visual acuity should not be less than 6/12 in one eye and 6/36 in the other, with glasses if necessary, and not less than 6/18 with both eyes unaided.
- Where spectacles are required to achieve the above standard, for operational duties they should be of a safety type approved by the Authority.
- The use of contact lenses is not permitted.
- Colour perception should be normal on initial testing by Ishihara plates. If a defect is found during the examination, a further test is to be carried out using a suitable



Ophthalmic Services Guidance

lantern to demonstrate the ability to distinguish the signal colour red, green and white.

- Where the fire-fighter's duties require the holding of a Heavy Goods Vehicle Licence (HGV) the appropriate DVLC standards and examination recommendations will apply.

Airside Drivers

- Eyesight standards required are DVLA Group 2 standard plus
- Colour perception should be normal on initial testing by Ishihara plates. If a defect is found during the examination, a further test is to be carried out using a suitable lantern to demonstrate the ability to distinguish the signal colour red, green and white (Giles-Archer lantern on large aperture).

RVR Observers (lighting panel operators)

Personnel selected for RVR observer should have an ophthalmic examination performed:

- Prior to acceptance for RVR duties
- 5-yearly up to 40, then 2-yearly to 50, then annually thereafter
- before return to duty following any sickness involving eyesight



Electrical engineers

The Institution of Electrical Engineers (IEE) (5) produces a fact-sheet on colour vision for prospective entrants. The following is quoted from that.

“Colour coding is widely used in the electronics and electrical engineering industries, and has particularly significant safety connotations. At the domestic level, the changes in colour coding of wires for electrical appliances, introduced in the 1960s, was introduced partly to make a used by colour deficient people safer.

Colour coding is used to differentiate the magnitude of resistors and capacitors, whilst in the telecommunications industry, extensive use is made of colour-coded wires. Errors in identification can have serious consequences.”

The IEE claims that electricians and telecom engineers are routinely screened for colour vision defects. It is thought that British Telecom gives prospective engineers an occupational test involving the matching of coloured wires, but we have been unable to confirm this.

Trainee electricians undertaking an apprenticeship through the Joint Industry Board of the Electrical Contracting Industry (JIB) (6) are required to produce a colour vision certificate; normal colour vision is a requirement of acceptance. The required standard is no more than two incorrect plates using the Ishihara test.



Fire Officers

The standard below is that recommended by the Association of Local Authority Medical Advisors (ALMA) (7) whose members perform the medicals for fire service employees and seems to be in widespread use by medical examiners.

Uncorrected Vision	6/18 better eye: 6/24 worse eye	
Corrected Visual Acuity	6/9 Binocularly: 6/12 worse eye	
Hyperopia	Maximum permissible +3.00D	
Myopia	No limit set (except for unaided vision standard above)	
Reading	Not specified but Breathing Apparatus gauges are N12 and radio dials are N6	
Field of vision	Normal in each eye (by confrontation)	
Colour Vision	Normal Trichromats	Acceptable
	Monochromats	Not Acceptable
	Dichromats	Not Acceptable
	Anomalous Trichromats	Require "Occupational Testing" Notes suggest that Protanomalous individuals will probably fail but Deutranomalous ones may pass

Colour vision

The recommended test procedure uses the Ishihara test as the initial screen, with two additional tests, usually the City University and Lantern tests, if the applicant fails the screening to determine the severity and type of colour vision deficiency. Individuals with either normal colour vision or slightly abnormal green colour vision are suitable for appointment to the fire service, as some Fire and Rescue Services offer job specific assessments to determine if colour blindness will affect the application.

Refractive surgery

Many Fire and Rescue Services are now accepting applicants who have undergone refractive surgery subject to a satisfactory medical report. These reports are interpreted by an occupational health team of doctors and nurses for the individual Fire and Rescue Service, who make the final decision for fitness.



The report must include:

- The date of surgery. Applicants will not be considered until they are 12 months post surgery
- Evidence that all medication relating to the surgery has stopped (Excluding lubricants)
- Details of any surgical or post-operative complications
- Details of the pre-operative refractive error
- Confirmation that there is no corneal haze over the pupil area
- Post-operative refraction, topography and pachymetry to confirm there is no keratectasia
- Evidence of satisfactory visual performance using a technique sensitive to the presence of scattered light and aberrations, e.g. using a low contrast LogMAR chart

Notes also tend to suggest that higher degrees of pre-operative myopia may not be accepted and Radial Keratotomy would probably not be acceptable.

LGV Driving

Many fire officers are required to drive LGVs as part of their duties and as such must also meet the DVLA eyesight requirements for a Class II (vocational) driving licence.

NOTE: Many Fire Services appear to be using variants of these standards and it is advisable to check the exact local standards with occupational health department of the Fire and Rescue Service(s) in your area (For a list see ref 8).



Police Officers

The following guidelines are issued by the Home Office for use in England and Wales (9).

Parameter	Mandatory Standard
Static visual acuity	<p>Snellen chart or equivalent</p> <p>Unaided Vision: 6/36 Binocularly</p> <p>Corrected VA: 6/12 in either eye and 6/6 Binocularly (Applicants who do not meet this do not fail, but are invited for re-test with a stronger prescription)</p> <p>Near VA (corrected): N6 at 40cm Binocularly</p> <p>Corrected low contrast visual acuity: should be 6/12 or better binocularly for a 10% low contrast target</p>
Visual field	<p>The mandatory test is by confrontation, but several forces are not using more sophisticated tests. Field of view of 120 degrees horizontally and 100 degrees vertically is required, and free of any large defects. Single defects smaller than the physiological blind spot or several defects that together are smaller or equal to the blind spot should be acceptable, except for those at the fovea. Any abnormalities should be referred to an ophthalmologist.</p>
Colour vision	<p>Monochromats are not acceptable. Anomalous Trichromats and Dichromats are acceptable but will need to “be aware of the deficiency and make appropriate adjustments”. These groups may be restricted to certain jobs.</p> <p>The use of colour correcting lenses is not acceptable. All the usual colour vision tests (Ishihara, City etc) are acceptable. It is possible that borderline cases will need to be assessed with the Farnsworth D15 test at a later date.</p>
Eye surgery	<p>LASIK, LASEK, PRK, ICRS, Epiflap and cataract surgery are all acceptable from 6 weeks post operative provided there are no residual side effects and the visual standards are met. Since visual performance may be degraded in low light conditions, visual acuity should be tested under low illuminance.</p> <p>Radial Keratotomy, Arcuate Keratotomy and Corneal Grafts are not acceptable as there is an arguable increased risk of corneal rupture and incapacitation if the officer is struck.</p>
Other	<p>History of retinal detachment or glaucoma is not acceptable.</p>



Non-Destructive testing

Persons involved in non-destructive testing are required to hold a Personnel Certificate in non-destructive testing (PCV). Candidates and certificate holders are required to meet visual standards set by the British Institute of Non-Destructive Testing (BINDT) (10).

VISION REQUIREMENTS (PSL/44 – issue 9 Rev A dated 5th September 2007).

All PCN candidates and holders of PCN certification shall have natural or corrected vision satisfying the following minimum requirement:

The candidate shall provide documented evidence of satisfactory vision in accordance with the following requirements:

- (a) Corrected or uncorrected near-vision acuity shall permit a minimum of Times Roman N4.5 or equivalent letters (having a vertical height of not more than 1.6 mm – see note 3) at not less than 30 cm.
- (b) Colour vision (see note 1) shall be sufficient that the candidate can distinguish contrast between the colours or shades used in the NDT method concerned as specified by the employer.

Subsequently to certification, the tests of visual acuity shall be carried out at least annually.

Records of tests shall be retained by the employer or responsible agency and provided to PCN upon request. Failure to do so will invalidate all PCN certification.

NOTE 1. All candidates and holders of PCN certification will be required to have had colour perception assessed by the Ishihara 24 plate test. The test is required only once since colour perception will deteriorate only under rare circumstances, such as if the individual develops diabetes. A record of test results should be retained and presented to BINDT upon request. In the event that a colour perception deficiency, indicated by misreading any of the first 17 plates, is detected during the Ishihara test, a further 'trade test' is to be carried out by the employer to ascertain whether the detected colour

perception deficiency affects the individual's ability to perform the NDT for which he is certificated. This trade test is to be documented and the record of the test made available to BINDT upon request.

NOTE 2. BINDT accepts that a nominated official of an Authorized Qualifying Body, or a PCN Level 3 certificate holder, having documented proof of satisfactory training in the



Ophthalmic Services Guidance

administration of the test, is medically recognized as competent to, and may therefore conduct such tests for candidates and holders of PCN certification. The PCN level 3 administering the near vision test must provide proof of appropriate training upon request by BINDT.

NOTE 3. Laminated hand held vision test charts are available from a number of suppliers, including the Institute of Optometry. Further information may be obtained from the Certification Services Division of the British Institute of NDT.

The form below may be used to record the results of near vision, colour perception and contrast tests. The person carrying out the vision test may use this form to signify that the individual meets the minimum PCN Vision Requirements.

The Royal College of Ophthalmologists



Ophthalmic Services Guidance

RECORD OF VISION TESTS

Name of individual tested: _____ PCN number: _____

Address: _____

Telephone: _____ Email: _____

Employer: _____

RESULT OF ISHIHARA COLOUR VISION TEST			
Record the Ishihara test results, and indicate if an alternative (trade) test is suggested.			
Number of Ishihara plates correctly interpreted:	Record of Ishihara plates failed (the test administrator may, optionally, provide comment on the nature of colour perception deficiency):		
RESULT OF COLOUR VISION TRADE TEST (WHERE NECESSARY - SEE NOTE 1)			
The employer should state the NDT methods and associated colours used by the employee:			
NDT METHOD	ASSOCIATED COLOURS	COLOUR DIFFERENTIATION	CONTRAST DETECTION
RESULT OF NEAR VISION TEST			
(record the smallest text capable of being read).			
CORRECTED		UNCORRECTED	
Times Roman N: _____, or Jaeger number: _____		Times Roman N: _____, or Jaeger number: _____	
DETAILS OF PERSON CARRYING OUT AND RECORDING ANY OF THE ABOVE TESTS			
Signature: _____		Name of tester: _____	
		Date of test: _____	
Organisation and telephone number (please use official stamp if available): 			



Motor Sport

The Motor Sports Association (MSA) UK (11), a division of The Royal Automobile Club Motor Sports Association Ltd is responsible for the medical standards in most 4-wheel motor sport in the UK.

The following are their standards:

- Minimum corrected visual acuity must be 6/6, binocularly.
- Minimum binocular visual field should measure at least 120 degrees along the horizontal meridian with no defects within the central 20 degrees
- Spectacles should be fitted with shatterproof lenses made from CR39 or polycarbonate. Glass lenses, even if 'heat treated' to enhance impact resistance are not acceptable. Contact lenses if worn should be of the "soft" variety. Glasses or contact lenses must be worn under a full face visor or goggles.
- A person who suddenly loses his sight in one eye will not be allowed to hold a licence until 5 years have elapsed.
- Diplopia is not compatible with the issue of a competition licence
- Drivers must have normal colour vision in that they can distinguish the primary colours of red and green.

In the event of any uncertainty as to whether or not any applicant satisfies the above requirements, information may be sought from the MSA's Medical Section Administrator.

Motorcycle Racing

The Auto-Cycle Union (12) sets the following standards for motorcycle and speedway racing:

- National licence 6/6 binocular
- International licence 6/6 each eye with correction
- Able to differentiate the coloured flags
- Competitors are allowed to wear spectacles, which must be shatter resistant or contact lenses, under a full face visor or goggles
- Speedway riders must have an eye test every two years

FIA International Competition Licences

The visual standard is the same as the MSA requirements above.



Refractive surgery and Motorsports

A licensed driver must not undertake competitive driving for a period of 3 months after refractive surgery. At the time of resumption of competitive driving, the ophthalmologist must certify in writing that:

- The eye is stable
- The risk of rupture of the globe of the eye as a result of crash impact is minimal and that the risk has been discussed with the competitor.
- The visual acuity standard is met and whether or not spectacles or contact lenses must be worn to meet the visual acuity standard.
- There is no other post surgical impairment of vision such as topographic irregularity, reduced low contrast sensitivity or exaggerated susceptibility to glare that may impede vision to an extent that may be a risk in competitive driving.



London Underground

The standards for London Underground train drivers, guards, and any other emergency or depot train driver, are as follows:

Best corrected VA 6/9 (better eye), and no less than 6/12 in the other eye.

Minimum unaided VA 6/60

Visual fields Full on confrontation

Near Vision N6 with or without glasses

Contact lenses are not permitted for train drivers or those required to undertake emergency train driving.

The spectacle frame should be of a design, which does not impede peripheral vision. London Underground has approved the specification for certain types of sunglasses for wearing in bright conditions, which do not impede colour appreciation of signals, or "hi-vis", and other reflective protective wear worn by staff working on the track during these conditions. No other sunglasses are permitted.

There should be no significant ophthalmological pathology, or any eye condition likely to cause sudden loss of vision. A driver who suffers from a temporary eye condition will be required to attend for eyesight testing before returning to duty.

Full colour vision is required, and is tested by the Ishihara Plates (no more than three misreadings and no errors).



Rail workers

Railway Group Standards are the basic minimum standards, which apply to everyone working on Railtrack owned infrastructure. The visual standards are intended to ensure that train drivers are able to perform their duties safely and efficiently in the cab as well as when outside the train on or near the line. The standard for distance vision for train drivers is the same standard that is recommended for personal track safety purposes for other staff and is also aligned with the DVLA standard for vocational (road) drivers.

Train Drivers (including On-Track Machine Drivers)

- Distance vision at least 6/9 in the better eye and 6/12 in the other, with spectacles or contact lenses if worn;
- Unaided vision to be at least 3/60;
- Near vision at least N8, with permitted correction applies to ensure that drivers are capable of interpreting written material and instruments in the course of their duties.
- No pathological condition likely to cause visual impairment;
- Bifocal glasses permitted (currently NOT varifocals);
- Tinted or photochromic prescription lenses prohibited; (however see note below re sunglasses. Whilst not explicit, this would seem to imply that a non-tinted prescription pair should be carried as well as sunglasses)
- Contact lenses are permitted provided that:
 1. The wearer has demonstrated that the lenses can be tolerated in place for the duration of duty and
 2. The nature of the work and the working environment is suitable for contact lens use;
 3. A spare pair of spectacles of equivalent prescription is also carried;
- The use of frame or clip on sunglasses is permitted provided that the sunglasses comply with BS EN 1836, are compliant with the requirements of Filter Category 2 as defined in that standard and are not photochromatic as defined in the standard. Prescription sunglasses which comply with these requirements are permitted.
- Normal colour vision, as tested by Ishihara Plates. Coloured spectacle or contact lenses are not permitted as a means of meeting the colour vision standard.

NOTE: Individuals who have undergone surgical procedures for the correction of near-sightedness will not be accepted for train driving work.



Guards, Conductors, Senior Conductors, Shunters

As for drivers except no specific requirement for near vision

Personal Track Safety (PTS)

- Distance vision at least 6/9 in the better eye and 6/12 in the other, with spectacles or contact lenses if worn;
- Contact lenses are permitted provided that a pair of spectacles of equivalent prescription is carried when on or near the line;
- No pathological condition likely to cause visual impairment;
- Tinted or photochromic prescription lenses allowed;
- Colour vision, as tested by Ishihara Plates to be reported as normal or abnormal. (Job specific requirements for colour vision apply).

Signallers and Crossing Keepers

As for PTS except that normal colour vision is required.

For signallers not required to have PTS Certification:

- Distance vision to be at least 6/12 in the better eye and 6/36 in the other with spectacles or contact lenses if worn;
- Normal colour vision is required.

Clerical and Non-Operational Staff

This group is not covered by Railway Group Standards and no formal standards now exist so individual railway companies are free to set their own standards.



Prison Officers

The current requirement is: Corrected Visual Acuity 6/12 or better in each eye.

There is now no reference to unaided vision and spectacles or contact lenses are permitted to reach this corrected standard.



Offshore oil and gas industry

Extract from “Guidelines for Medical Aspects of Fitness for Offshore Work” Issue 5 October 2003 (13).

Visual acuity adequate to permit the individual to mobilise and work safely in the offshore environment is essential and should be confirmed at each medical examination. Any eye disease or visual defect rendering, or likely to render, the applicant incapable of carrying out duties efficiently and safely is unacceptable.

Visual acuity. Visual acuity in the better eye should be at least 6/12 using corrective lenses as necessary. Higher standards of acuity are required for some specific roles. An uncorrected visual acuity of 6/60 is recommended to permit emergency mobilisation around a location without corrective lenses if necessary. Individuals who require lenses to meet the visual standard should be encouraged to carry two pairs during a period of mobilisation offshore.

Monocular vision is acceptable provided the above minimum standard of acuity is met and the individual shows appropriate adaptation to the loss of binocular vision. Special attention should be given to protecting the monocular eye from high hazard operations.

Diplopia, if persistent, poses a safety hazard and is unacceptable for offshore working.

Visual fields should be full and unrestricted and should be tested by confrontation. Where this suggests a deficit then referral for mapping may be necessary. Significant field deficits as a result of progressive eye disease, diabetes, or cerebrovascular events should be referred for a specialist opinion.

Colour vision is only required for specific tasks such as electrical work and need not be assessed unless specifically required for this purpose or a similar colour dependent task.

Stereoscopic vision is not required for normal offshore tasks unless the individual is also required to operate cranes.

Glaucoma, which is adequately controlled and has not compromised visual acuity, may be acceptable but specialist referral and restricted periods of certification not exceeding one year will normally be required.

Uveitis. Acute cases usually resolve and need not restrict offshore employment once resolved. Chronic uveitis will normally cause significant impact on vision and will normally prevent offshore working.



Lifeboat Crew Members (RNLI)

The visual acuity standards are as follows:

Pre-enrolment	Better eye	Other eye
Unaided	6/24	6/36
Corrected	6/6	6/9
Serving crew	Better eye	Other eye
Unaided	6/60	6/60
Corrected	6/6	6/9

Any crew member whose unaided vision is worse than 6/12 must wear visual aids (i.e. RNLI service spectacles or contact lenses) on lifeboat duty. It is a condition of service that the crew member will only be allowed afloat when the visual aid is being worn.

Spectacles

Both all-weather and inshore lifeboat crew members who need to wear aids to meet the standard above, while on lifeboat duty, will be required to wear RNLI service spectacles provided by the Institution or contact lenses. Non-contact lens wearers must carry a spare pair of RNLI service spectacles with them in case of emergency. RNLI service spectacles (with or without sideshields) will be provided by the RNLI without charge to the crew member.

Contact lenses

Contact lens wear is permitted in lifeboats at sea and contact lens wearers may choose to wear their lenses or RNLI service spectacles, but must in any event carry a spare pair of RNLI service spectacles with them in case of emergency.

Frequency of eyesight tests

Serving crew members are required to furnish satisfactory eyesight reports every five years from the date of their first enrolment or appointment. However, in some circumstances such reports may be required more frequently.



Colour Vision

Candidates will be required to pass a colour vision test using Ishihara plates, but in cases of dispute or uncertainty, applicants may be asked to undertake an MCA (or Department of Marine in the Republic of Ireland) lantern test for colour vision. In such cases arrangements will be made with the Personnel Department at RNLi headquarters.



Seafarers and coastguards

The following are excerpts from the standards issued by the Maritime and Coastguard Agency (14). They should not be taken as a definitive statement of the full regulations.

For the majority of seafarers visual acuity and colour vision are tested as part of the general medical examination. Some seafarers need a separate certificate and optometrists will carry out this vision test. The following seafarers require such a vision test:

- A merchant navy deck department candidate applying for a certificate of competency whose UK medical fitness certificate was issued more than 2 years ago.
- A candidate for a fishing vessel certificate of competency, deck department.
- A candidate for a certificate of competency presenting a non-UK medical certificate, which does not confirm that they have met the statutory visual acuity and colour vision standard.

There is no statutory requirement for prospective seafarers to have a full sight test, but they are advised to do so before commencing training.



Vision Standards for the seafarer vision test

Category of Seafarer	Basic Visual Acuity Standard- unaided		Higher Visual Acuity Standard- aided if necessary		Near	Colour vision	Visual Field
	Better eye	Other eye	Better eye	Other eye			
Deck or Dual Career	6/60	6/60	6/6	6/12	N8	Pass Ishihara or Lantern 2 miles	No pathological field defect
Engineer/ Radio	6/60	6/60	6/18	6/18	N8	Pass Ishihara or Farnsworth D15 or City University	Sufficient to undertake duties efficiently
Others	Sufficient to undertake duties efficiently						
Vision standard for serving seafarers who become monocular (with no evidence of progressive eye disease in the remaining eye)							
Deck	6/60	N/A	6/6	N/A	N8	Pass Ishihara or Lantern 2 miles	No pathological field defect
Engineer/ Radio	6/60	N/A	6/9	N/A	N8	Pass Ishihara or Farnsworth D15 or City University Test	Sufficient to undertake duties efficiently
Others	Sufficient to undertake duties efficiently						
There should be a sufficient period of adaptation after becoming monocular to enable stairs to be descended rapidly and safely							

- Binocular vision is normally necessary for all categories of seafarer
- Ishihara is tested using 38 or 24 plates

- Applicants who fail the colour vision test may arrange to be tested using the Holmes Wright B Lantern at an MCA office.
- Aids to colour vision, e.g. x-chrom and Chromagen lenses are not permitted.
- The test is valid for two years.
- There is no fee set by MCA, this is at the discretion of the ophthalmologist.
- No diplopia, congenital night blindness, retinitis pigmentosa or any other serious or progressive disease is permitted.
- A period of adaptation should be allowed for bifocal glasses because of the risk of falls.
- Tinted prescription glasses (not polarising) should be worn when glare is a problem.
- A spare pair of glasses or contact lenses should be carried.
- Those in service who suffer pathological field defects should have a field of at least 120° in the horizontal with no significant defect in the binocular field which encroaches within 20° of fixation above or below the meridian. Homonymous or



Ophthalmic Services Guidance

bitemporal defects which come close to fixation, whether hemianopic or quadrantopic, are not accepted.

- In the few cases where the new standard is marginally higher than previously, those in service before the date of publication may continue to be assessed by the former standard. i.e.
 - (a) Deck department personnel required to operate lifting plant, aided visual acuity 6/9 for better eye;
 - (b) Deck department personnel not required to perform lookout duties or to operate lifting plant, aided visual acuity 6/18 for better eye;
 - (c) Engineers, aided visual acuity 6/60 for the other eye.

Coastguards

Have a medical examination, but only a basic eyesight standard is required, as long as they can conduct their duties sufficiently. The RNLI's recommended eyesight standard for Lifeguards is currently 6/18, 6/18 unaided, correcting to 6/9, 6/9 using glasses or contact lenses.



Summary

Few would deny that vision is a vital aspect for many jobs, and visual requirements have been determined for careers for which visual abilities are thought to be critical. Whether the job involves driving, quality control, sorting things by colour in a manufacturing plant or making critical life and death decisions, having good vision is usually fundamental for efficient and safe performance.

A typical adult in the UK will spend up to 60% of their waking life at work and work and health are critically dependent on each other (15). In some cases refractive surgery can allow applicants who would otherwise be unfit for their intended occupations to pursue their chosen vocation, but in others surgical procedures or common eye conditions can have a significant on medical fitness for work. It is therefore recommended that ophthalmologists inquire in detail about patients' current and prospective careers.

It is important to be familiar with not only what a patient's job title is, but to question if there are visual standards published for that role, and also we should try and understand the specific visual tasks their work demands to get an idea of how their individual eye condition, or prospective surgery (such as refractive surgery), might affect their livelihood. Does the patient work in dim light conditions for example at night? Does the job involve life or death decisions? Is speed a factor in task performance, such as inspection workers on a production line? Does the job involve driving?

Taking a patient's occupational history should not be confined to when we are involved in writing reports for insurance companies or for employers, it should be part of everyday practice, and ophthalmologists need to be familiar with occupational visual standards.



References and useful contacts

1. Ramazzini B. *De Morbis Artificum* (2nd Latin edn, 1713). [Trans.Wright WC. Diseases of workers. Chicago, IL: University of Chicago Press, 1940.]
2. The Civil Aviation Authority (CAA) Medical division www.caa.co.uk/medical (Gatwick Airport South, West Sussex, RH6 0YR, UK)
3. Joint Aviation Authorities (JAA) www.jaat.eu/licensing/licensing_jars.html
4. National Air Traffic Control Service (NATS) www.nats.co.uk
5. The Institute of Electrical Engineers (IEE) www.ieee.org.uk
6. Joint Industry Board of the Electrical Contracting Industry (JIB) www.jib.org.uk
7. Association of Local Authority Medical Advisors (ALMA) www.alma.org.uk
8. A list of UK Fire and Rescue Services can be found here:
<http://www.fireservice.co.uk/information/ukfrs.php>
9. Home Office Circular HOC 59/2004. Police Officer Medical Standards www.homeoffice.gov.uk/about-us/publications/home-office-circulars/circulars-2004/059-2004/
10. British Institute of Non-Destructive Testing www.bindt.org
11. The Motor Sport Association UK www.msauk.org/custom/asp/home/default.asp
12. The Autocycle Union www.acu.org.uk/
13. Guidelines for Medical Aspects of Fitness for Offshore Work Issue 5 October 2003 www.appea.com.au/index.php?option=com_content&task=view&id=259&Itemid=99
14. The MCA Seafarer Health & Safety Branch, Bay 2/1, Spring Place, 105 Commercial Road, Southampton, SO15 1EG, Tel: 02380 329100, Fax: 02380 329165.
15. Bradshaw SE. Life's work: occupational health- the wealth of the nation. *British Journal of General Practice* 2008;58(554):605-6

For an excellent guide to disorders of colour vision and colour vision tests, see "Colour vision examination, a guide for occupational health providers":
www.hse.gov.uk/pubns/ms7.pdf

The Association of Optometrists has a website containing up-to-date visual standards required by variety of occupations, including the armed forces. For further information contact www.assoc-optometrists.org/services/services_visual.html 61 Southwark Street, London SE1 0HL. Tel 44 (0) 20 7261 9661, Fax 44 (0) 20 7261

The Society of Occupational Medicine (SOM) is available to all doctors with an interest in occupational health: www.som.org.uk

Higher specialist training in occupational health is supervised by the Faculty of Occupational Medicine (FOM), based at the Royal College of Physicians:
www.facocmed.ac.uk

Distance learning Occupational Medicine Diploma courses are available at the Centre for Occupational and Environmental Health from the University of Manchester: www.coeh.man.ac.uk and the Institute of Occupational and Environmental Medicine at Birmingham University: www.pcpoh.bham.ac.uk/ioem



Ophthalmic Services Guidance

National and regional occupational health resources:

The Health and Safety Executive (HSE) oversees health and safety in a wide range of working environments including factories, hospitals and schools: www.hse.gov.uk

England: NHS Plus is a network of NHS Occupational Health Departments that provides occupational health services to both NHS and non-NHS organisations in England: www.nhsplus.nhs.uk

Scotland: www.healthyworkinglives.com

Wales: www.hse.gov.uk/workplacehealth/workboostwales/index.htm

Northern Ireland: Employment Medical Advisory Service (EMAS): www.hseni.gov.uk

The Health Work and Wellbeing Initiative website has further guidance information for both doctors and employers throughout the UK: www.workingforhealth.gov.uk

Acknowledgements:

With special thanks to the Association of Optometrists (AOA), for allowing us to use some their material on visual standards.

Author: Steven E. Bradshaw, StR in Ophthalmology

Revision date: 2013