

# Canadian Vision Standards

J.K. Hovis \*

**A**s primary vision care providers, optometrists are often asked whether a patient's vision meets the standard established for a particular occupation. In order to address these inquiries appropriately, optometrists must have knowledge of the various vision standards. This article provides a summary of federally-mandated vision requirements as a reference. However, because these standards are under continual revision, it will be necessary to update them from time to time.

In this summary, tests and testing procedures are not listed if they are similar to standard clinical procedures. With respect to colour vision evaluation, patients *are not* allowed to use any coloured filter aids during testing to improve their colour perception. The use of a pseudoisochromatic plate test that is not one of the specified tests is usually a valid procedure, because individual test validity is high and inter-test correlations between many plate tests is quite good.<sup>1</sup> That is, a person who passes (or fails) one test has a high probability of passing (or failing) another test. Nevertheless, patients who "just-pass" or "just-fail" a nonspecified colour vision test should have their colour vision reassessed with the specified test. Patients who pass or fail the colour vision test in a vision screening machine should also have their colour perception reassessed, because many of these tests have a very low validity.<sup>1</sup> Several agencies require further testing with the Royal Canadian Navy (RCN) Lantern Test to determine if a

colour defective person can safely perform his/her duties. Although this Lantern Test is no longer manufactured, a working model may be available at a Canadian Forces base or a rail company's regional office.

## Vision Requirements for Engagement in the Royal Canadian Mounted Police<sup>2</sup>

**Uncorrected visual acuity:** 6/12 in better eye, 6/30 in other eye; or 6/18 in each eye.  
**Corrected visual acuity:** 6/6 in better eye, 6/9 in other eye; or 6/6 in each eye.  
**Colour vision:** Pass the 38 plate edition of the Ishihara Colour Vision Test (4 or

less errors on plates 1 to 21); or if s/he fails, then the candidate must pass the Farnsworth-Munsell Panel D-15 Test (less than 2 transpositions that parallel an error axis).

**Binocular vision:** No strabismus or history of diplopia.

**Visual fields:** Binocular visual field extending at least 120° in the horizontal meridian.

## Vision Standards for Merchant Marine Master and Mate Certificates<sup>3</sup>

**Uncorrected visual acuity:** 6/60 in each eye.

TABLE 1  
Visual Acuity Grades for the Canadian Forces\*.

Acuity Grade	Uncorrected Acuity		Corrected Acuity	
	Better Eye	Other Eye	Better Eye	Other Eye
V1	6/6	6/9	N/A	N/A
V2	6/18	6/18	6/6	6/6
	or			
V3	6/12	6/30		
V4	6/120	6/120	6/9	6/9
	N/A	N/A	6/9	6/120
	(As long as refractive error does not exceed $\pm 7.00D$ in any meridian in the better eye)			
V5	Reserved for serving personnel with corrected acuity worse than 6/9, but, in the opinion of an ophthalmologist, can perform their duties satisfactorily.			
V6	Assigned to candidates who do not meet V4.			

\*Refers to eyes that are unaltered by orthokeratology, and, presumably, radial keratotomy.

\*O.D., Ph.D.  
School of Optometry  
University of Waterloo



**TABLE 3**  
Visual acuity and cycloplegic refraction standards for entry into  
Canadian Forces aircrew personnel.

	Pilot and Tactical Helicopter Observer				Search and Rescue Specialist				Other Aircrew			
	Better Eye		Other Eye		Better Eye		Other Eye		Better Eye		Other Eye	
	Distance	Near	Distance	Near	Distance	Near	Distance	Near	Distance	Near	Distance	Near
Uncorrected Visual Acuity	6/6	.65M (N5)	6/9	.75M (N6)	6/12	1.0M (N8)	6/30	1.3M (N12)	6/120	N/A	6/120	N/A
					6/18	1.2M (10) or	6/18	1.2M				
Corrected Visual Acuity	N/A		N/A		6/6	.65M (N5)	6/9	.75M (N6)	6/6	.65M (N5)	6/9	.75M (N6)
Cycloplegic Refraction												
Sphere Power	Between -0.25 and +2.50D in either eye				N/A				Between -2.00D and +3.50D in either eye			
Cylinder Power	Not more than 0.75D in either eye				N/A				Not more than 1.25D in either eye			

**TABLE 2**  
Colour Vision Grades for the  
Canadian Forces

Colour Vision Grade	Test Results
CV1	Passes Pseudoisochromatic Plate Test (this is either the Ishihara or AO Pseudoisochromatic Plates)
CV2	Fails the Plate Test, but passes the RCN Lantern Test
CV3	Fails the Plate and Lantern Tests

**Corrected visual acuity:** 6/9 in each eye, or if person began duty before June 1, 1973, then the standard is 6/9 with both eyes together.

**Colour vision:** The passing criteria for the three editions of the Ishihara Colour Vision Test are as follows:

- 1) 3 or less errors on plates 1 to 21 of the 38 plates edition,
- 2) 2 or less errors on plates 1 to 15 of the 24 plates edition,
- 3) 1 error on plates 1 to 8 of the 16 plates edition.

**TABLE 4**  
Visual acuity and cycloplegic refraction standards for experienced  
aircrew in the Canadian Forces.

	Experienced Pilot		Other Experienced Aircrew	
	Better Eye	Other Eye	Better Eye	Other Eye
Uncorrected Visual Acuity	6/12	6/30	6/120	6/120
	6/18	6/18		
Corrected Visual Acuity	6/6	6/9	6/6	6/9
Cycloplegic Refraction				
Sphere Power	Between -1.00D and +3.50D		Between -2.00D and +3.50D	
Cylinder Power	Not more than 1.25D		Not more than 1.25D	

For candidates who fail the Ishihara Test, their colour vision can be assessed by RCN Lantern Test. If s/he fails the Lantern Test, then the candidate is rejected.

### Vision Standards for the Canadian Forces<sup>4</sup>

Minimum visual acuity and colour vision requirements for various trades and assignments in the Canadian Forces are

specified by numerical grades. Because there are over one hundred different positions with vision requirements, this paper only defines the visual acuity and colour vision grades. These are listed in Tables 1 and 2. Information concerning a specific assignment's standards can be obtained from a local recruiter. Aircrew candidates, however, must meet additional visual requirements and these are presented separately.

The vision requirements for any assignment or trade may be relaxed on an



**TABLE 5**  
**Vision standards for railway workers.**

		Entrance into service	Promotion	Re-examination
A (Engineers, Motormen, Firemen, Diesel Helpers in Road Service); B (Engineers, Motormen, Diesel Helpers in Yard, Outside Hustler); and C (Brakemen, Yard Helpers, Switch Tenders, Operators, Towermen)	Uncorrected Visual Acuity	6/9 in better eye 6/12 in other eye	6/9 in better eye 6/15 in other eye	6/9 in better eye 6/15 in other eye (Class B 6/9 in one eye regardless of other eye, Class C 6/6 in one eye regardless of other eye)
	Corrected Visual Acuity	6/6 in each eye	Same as uncorrected	Same as uncorrected
	Colour Vision	Normal	Normal	Normal
	Visual Fields	Normal	Normal (N/A for Class C)	Normal (N/A for Class C)
D (Conductors, Yardmasters, Yard Foremen, Train Baggage men)	Uncorrected Visual Acuity	6/9 in better eye 6/2 in other eye	6/9 in better eye 6/15 in other eye	6/12 in better eye and 6/15 in other eye, or 6/9 in better eye and 6/21 in other eye, or 6/6 regardless of vision in other eye
	Corrected Visual Acuity	6/6 in each eye	6/6 in better eye, or meets uncorrected standards	Same as uncorrected
	Colour Vision	Normal	Normal	Normal
	Visual Fields	Normal	N/A	N/A
E (Partial list includes: Dispatchers, Station Agents, Signalmen, Welders)	Uncorrected Visual Acuity	6/9 in better eye 6/15 in other eye	N/A	6/12 in better eye and 6/21 in other eye, or 6/9 in one eye regardless of vision in other eye
	Corrected Visual Acuity	Same as uncorrected	N/A	Same as uncorrected
	Colour Vision	Normal	N/A	Normal
	Visual Fields	Normal	N/A	N/A
F (Flagmen, Watchmen, Gatemen)	Uncorrected Visual Acuity	6/12 in each eye	N/A	6/15 in one eye and 6/21 in other eye, or 6/9 in one eye regardless of vision in other eye
	Corrected Visual Acuity	Same as uncorrected	N/A	Same as uncorrected
	Colour Vision	Normal	N/A	Normal
	Visual Fields	Normal	N/A	N/A
G (Helpers operating snow plow or other equipment moving on truck coupled ahead of locomotive)		Same standards as for Class A re-examination	N/A	Same standards as for Class A re-examination

individual basis if the candidate has experience in that particular area.

### **Vision Standards for Aircrew Personnel Within the Canadian Forces<sup>4</sup>**

**Visual acuity:** Acuity and cycloplegic refraction standards for entry level and experienced aircrew are listed in Tables 3 and 4.

**Colour vision:** The minimum grade is CV2.

**Binocular vision:** No diplopia or history of diplopia. No strabismus. Horizontal phorias should be greater than 6<sup>Δ</sup>, and vertical phorias should not be greater than

1<sup>Δ</sup>. Individuals with larger phorias will be considered eligible for aircrew duty depending upon experience, stereopsis, refusion speed, and refractive error.

Visual fields, slit lamp examination, and intraocular pressures must be within normal limits.

### **Vision Standards for Railway Workers<sup>5,6</sup>**

Railway positions that have vision standards fall into one of seven classes. The seven classes and their visual requirements are outlined in Table 5. In addition to these requirements, all seven classes must have a minimum near visual acuity

of .75M (corrected or uncorrected), and normal, single binocular vision (i.e., no strabismus or diplopia).

Colour vision can be assessed with either the Ishihara or AO Pseudoisochromatic Plates Colour Vision Tests. Errors on 28% or more of the screening plates constitutes a failure. A Lantern Test or Colour Threshold Tester (no longer commercially available) can be used to determine if a person who fails the plate test can accurately identify coloured signal lights. Persons who pass the secondary tests may be assigned to the position depending upon a committee's recommendations.

Visual fields are assessed by the confrontation method. Normal limits are



defined at 90° temporally, 60° nasally, 55° superiorly, and 70° inferiorly.

All employees are required to wear spectacles to correct their vision while working. However, contact lenses may be worn if the employee has undergone cataract surgery, cannot obtain the standard acuity by any other means, or has demonstrated that contact lenses are well tolerated when worn during work.

## Vision Standards for Civil Aviation<sup>7</sup>

Transport Canada's rules and regulations were outlined in a 1976 issue of the *Canadian Journal of Optometry*<sup>8</sup>. Many amendments have since been added, and so the following updates the previously published requirements.

The number of licensing categories has recently increased from three to four. Category 1 applies to airline and commercial pilots; Category 2 applies to flight navigators, flight engineers, and air traffic controllers; Category 3 applies to private, glider, balloon, gyroplane, commercial gyroplane (in flight instruction), and all of the corresponding student pilots; and Category 4 applies to ultra-light aircraft pilots and student pilots. Category 4 has only two standards: distance visual acuity of at least 6/9 (corrected or uncorrected) in the better eye and normal visual fields.

The more stringent requirements for categories 1 to 3 are as follows:

**Ocular health requirements for categories 1 to 3:** There should be no active ocular pathology that could interfere with the applicant's performance.

**Ocular muscle balance standards for categories 1 to 3:** Lateral phoria limit (no strabismus) is 6<sup>Δ</sup> and the vertical phoria limit is 1<sup>Δ</sup>. Applicants who do not meet this standard will be referred to an ophthalmologist for further evaluation. The applicants may be licensed provided that diplopia is unlikely.

**Colour vision requirements for categories 1 to 3:** Colour perception is classified as normal if a patient passes any edition of the Ishihara Colour Vision Test, the AO Standard Pseudoisochromatic Plates, or the AOHRP Colour Vision Test. Minimum passing criterion for the Ishihara and AO Standard Tests is 83% correct on the screening plates. The passing criterion for the AOHRP test is 100% correct on the first six screening plates. Applicants who fail any one of these tests are administered a practical

colour perception test to determine if their colour vision is adequate for performance of their duties. This test consists of identifying the colours of airport signal lights while in flight.

Commercial or private pilot license applicants who fail both the pseudoisochromatic and practical colour vision tests can be issued a license for daylight flying only, and they must have a 2-way radio in the plane for use at controlled airports.

**Visual acuity standards for categories 1 to 3:** Minimum corrected or uncorrected acuity is 6/9 in each eye. However, there are allowances for applicants who meet the 6/9 criterion with only one eye outlined at the end of this section. If correcting lenses are worn, then the applicant must have a spare pair of spectacles for immediate use when performing his/her duties. Contact lenses can be used as correcting lenses if vision is stable and the lenses are comfortable after a six month trial period. Contact lens wearers are required to have a pair of spectacles available for immediate use if the lenses are removed or become dislodged. The spectacle correction must allow them to meet the acuity standards. For lens wearers with appreciable spectacle blur, a third pair of spectacles may be required so that they can meet the standards immediately after lens removal and after the eye has stabilized.

Prescription sunglasses are not allowed as the second pair of correcting lenses during night flight.

Although the applicant is allowed to have correcting lenses in order to meet the distance acuity requirement, the lenses spherical equivalent power cannot be greater than  $\pm 3.00$  for categories 1 and 2 and  $\pm 5.00D$  for category 3. Exceptions to the lens power requirements are possible for categories 2 and 3 applicants in accordance with medical opinion.

In addition to distance acuity standards, applicants in all three categories are required to have near visual acuities (corrected or uncorrected) of .65M (N5) at 40 cm and 1.60M (N14) at 100 cm. If a correction is needed to meet these standards, then the lens design must allow the applicant to meet the distance requirement without removing the lenses.

**Allowances for monocular applicants and persons with substandard vision in one eye:** Monocular applicants are persons whose visual acuity in one eye cannot be corrected to at least 6/60. These people may be granted a license if the uncorrected acuity in the better eye is

6/60 and can be corrected to a minimum of 6/9 with an equivalent sphere power of no greater than  $\pm 3.00D$ . The function of the better eye must be normal in all other respects, and the applicant must pass a flight test. An optometrist's or ophthalmologist's report is required for each revalidation of the license.

Applicants with substandard vision in one eye are persons whose corrected acuity in one eye is between 6/9 and 6/60. For these applicants, the visual acuity, correcting lens power, and colour vision of the better eye must meet the appropriate standards, and medical opinion or a flight test indicates that the visual defect is unlikely to interfere with the applicants performance. Annual reports are required if the condition is progressive.

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