

Operational Colour Vision Assessment – Guidance for Candidates



For more information, visit www.caa.govt.nz/colour-vision

Colour Vision Deficiency (CVD) is a condition that results in individuals being unable to distinguish differences between certain colours. The condition is most commonly inherited, affecting approximately 8% of men and 0.5% of women.

A continuum exists in the severity of CVD. At the most benign end of the continuum an individual may have near normal colour vision. At the opposite extreme, an individual may be monochromatic: the latter is extremely rare. Whilst CVD is most usually inherited, it may also be acquired as a result of some medical conditions such as diabetes or eye degeneration.

CAA approach to colour vision deficiency

The CAA approach to assessing CVD pilots is one that constitutes both medical assessment and practical competency assessment in a 3-stage process. A flow chart depicting this process is at Appendix 1.

Pilots with the mildest forms of CVD, as assessed by clinical testing, are eligible for unrestricted medical certification in New Zealand. Those with more severe CVD, may still fly but with restrictions on their medical certificate that prevents them operating to and from controlled aerodromes without a radio, flying at night or carrying passengers on air operations. The last two restrictions may be removed by passing an operational flight assessment. The first cannot be removed because, without a radio, the control tower may use colour light signals to communicate with aircraft in an emergency; misinterpretation due to CVD could therefore constitute a safety risk. Note that colour-corrective lenses (such as X-Chrom, ChromaGen and Colourview) may not be used during any stage of the CVD assessment process.

Stage 1 - Screening for colour vision deficiency

The first stage of the colour vision screening test used in New Zealand is the Ishihara Pseudo-Isochromatic Plate test. This is a booklet of coloured plates where applicants are tested by being asked to identify a number or pattern on each page.

In most cases colour vision is only tested once, for initial issue of a medical certificate. It is possible for it to need to be tested again, especially if something changes, but this is very unusual. The pass criteria for the Ishihara assessment differs between the different types of Ishihara test. Passing the Ishihara test means that the applicant meets the colour vision standard.

Stage 2 - Alternative clinical colour vision tests

Someone who has failed the Ishihara screening test could be issued with a restricted medical certificate without further investigation, but further testing can be carried out to identify the nature and severity of the applicant's colour vision deficit. This may be achieved through a second stage of testing using the Holmes Wright lantern, Farnsworth lantern, CAD test or Farnsworth D15 test. If any one of these second stage tests is passed the candidate will receive an unrestricted medical certificate. Otherwise, the candidate will receive a medical certificate which includes restrictions that prevent them operating to and from controlled aerodromes without a radio, flying at night or working in air operations with passengers.

Stage 3 - Operational colour vision assessment

Noting that the listed clinical tests are conservative in their nature and hence are difficult to pass with anything more than mild colour vision deficiency, in stage 3 of the testing the applicant may seek to have the restrictions against night flying and working in air operations with passengers removed by undertaking an operational colour vision assessment (OCVA). This consists of a ground and flight assessment, in which the candidate must demonstrate the ability to read and interpret charts, instrumentation, displays, aeronautical lighting, and terrain and conditions. The assessment is carried out initially by day and may be repeated at night for those candidates wishing to remove the night limitation.

As this is a flight assessment, it is desirable that applicants have some experience in piloting aircraft. It is therefore best undertaken part way through training, probably at or about the point where a pilot would normally undertake the PPL flight test or have some night flying experience prior to completing a night rating. Advice on when the assessment should be undertaken should best be made in consultation with an A or B Cat flight instructor, with the final decision on timing to be made by the candidate. Prior to the commencement of an assessment the applicant must produce evidence of their identity.

The applicant may choose to undertake the assessment in the day time only or during the day time and night time. The day OCVA must be completed before the night assessment. If the applicant passes the day time component of the OCVA, they will be permitted to undertake air operations with passengers (if appropriately licenced) and will have restrictions on their medical certificate reduced to –

'Not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control.'

'Not valid for night flying.'

If the applicant passes both the day and night time component of the OCVA, they will be permitted to undertake air operations with passengers and to fly at night (if appropriately licenced and rated) and will have restrictions on their medical certificate reduced to –

'Not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control.'

Conduct of operational colour vision assessment

The OCVA must be conducted by a Category A flying instructor. The OCVA is to be conducted during the day time if the applicant seeks only the privilege to carry passengers on air operations by day. The OCVA must be repeated or extended into the night if the applicant seeks a night flying privilege.

The assessment must be conducted independently and cannot be combined with other flight testing/assessment activities such as the issue or renewal of a flight crew licence, the issue or renewal of a flight crew rating, initial or periodic flight crew competency tests or operational checks, and Biennial Flight reviews. The airborne element of the assessment by day and night must be flown in an aircraft; the use of a simulator, regardless of its certification or approval, is not permitted. The day and night OCVA must be conducted at an airport certified under Civil Aviation Rule Part 139. The night assessment must be completed at an airport where a fully representative range of permanent runway, taxiway and ground lighting is available.

In the day time, the applicant is required to:

- Read and correctly interpret in timely manner aeronautical charts, including print in various sizes, colours and fonts, symbols, lines and terrain markings. Aeronautical chart reading may be performed in daylight or artificial light conditions where the chart would normally be read.
- Read and correctly interpret in timely manner aircraft instrumentation and displays, particularly those with coloured markings, warning lights and coloured displays.
- Recognise terrain and obstructions in a timely manner including the surface condition of several emergency landing fields. The applicant should be able to describe surface features and obstructions.

During the transition to night, and in the night, the applicant is required to:

- Read and correctly interpret in timely manner aeronautical charts, including print in various sizes, colours and fonts, symbols, lines and terrain markings. Aeronautical chart reading may be performed under any light condition where the chart would normally be read.
- Read and correctly interpret in timely manner aircraft instrumentation and displays, particularly those with coloured markings, warning lights and coloured displays.
- Visually identify in a timely manner the location and significance of lights on other aircraft or airfields. This may include:

Reporting requirements of the medical examiner

If sections 12 - 14 of OCVA form indicate a satisfactory performance by the applicant only in day time operations, and subject to the applicant having no other relevant medical conditions, it is appropriate for the AME to amend the applicant's medical certificate restrictions to:

'Not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control.'

'Not valid for night flying.'

If sections 12 - 14 of form OCVA form indicate a satisfactory performance by the applicant in both day and night time operations, and subject to the applicant having no other relevant medical conditions, it is appropriate for the AME to amend the applicant's medical certificate restrictions to read:

'Not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control.'

In both the cases above the revised medical certificate should be re-issued to the applicant.

The medical examiner is to forward a copy of the amended medical certificate and the completed OCVA form to the CAA Aviation Medicine Team, CAA, PO Box 3555, Wellington 6140.

Period of validity of results

The results of an OCVA are valid for an indefinite period. A pilot is responsible for reporting any perceived, or clinically confirmed changes, to their colour vision deficiency to the CAA medical staff.

Risk of pilots flying with a colour vision deficiency

Empirical and clinical evidence indicates that applicants with CVD are able to operate safely provided they have successfully completed the applicable level of training and testing to demonstrate their competence and comply with any restrictions that are imposed.

Foreign pilots seeking certification in New Zealand

New Zealand's colour vision standards may be different to other countries who may issue unrestricted medical certificates to some colour vision defective applicants that New Zealand would not.

Foreign applicants seeking medical certification in New Zealand must have their colour vision assessed according to the New Zealand CAA medical standards and procedures. It is possible this assessment may have a different outcome to that completed under another country's jurisdiction.

Colour Vision Assessment Guidance



STAGE 1

Pilot sees Aviation Medical Examiner for Class 1 or Class 2 Medical Certificate

Pass Ishihara with one error or less

YES

NO

DECIDE NOT TO TAKE MORE TESTS

MEDICAL CERTIFICATE COLOUR VISION DEFICIENCY RESTRICTIONS



No Colour Vision Deficiency
Meets the standard of CAR 67.103

STAGE 2

Pass one of these tests:

- Farnsworth D15 (test available nationwide)
- Holmes-Wright lantern or
- Farnsworth lantern + Anomaloscope (and not red deficient) or
- Colour Assessment and Diagnosis test

YES

NO



Colour Vision Deficiency is not of aeromedical significance
Meets the standard of CAR 67.103

STAGE 3

Pilot gets advice from Aviation Medical Examiner then books Operational Colour Vision Assessment with A-cat instructor

Pass Operational Colour Vision Assessment

NO

YES



Colour Vision Deficiency is not of aeromedical significance provided the certificate is endorsed:

- Class 1: Not valid for air operations carrying passengers; and
- Class 1 & 2: Not valid for night flying; and
- Not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control



Colour Vision Deficiency is not of aeromedical significance provided the certificate is endorsed:

- Class 1 & 2: Not valid for night flying; and
- Not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control



Colour Vision Deficiency is not of aeromedical significance provided the certificate is endorsed:

- Not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control

PASSED FOR DAY FLYING ONLY

PASSED FOR DAY & NIGHT FLYING

31 May 2019