

Colour Vision

Many of our day-to-day activities require the ability to tell different colours from one another. Professionals often require accurate colour vision to do their work safely: Doctors regularly use colour differences in making diagnostic and treatment decisions; Dentists have to be able to identify subtle tooth colour differences; Electricians are regularly faced with different coloured wires and coloured component markings; and pilots and air traffic controllers rely on the interpretation of colour-coded information on instruments, on charts and other documents, and on airborne and ground-based lights.

The quick and correct assessment of colour is very important for safety in aviation.

This Medical Information Sheet provides information, for medical examiners and medical certificate holders and applicants, concerning the colour vision requirements for New Zealand pilots and Air Traffic Controllers.

Can “colour blind” pilots fly in New Zealand?

Pilots with the mildest forms of colour vision abnormalities are eligible for unrestricted medical certification in New Zealand. Those with more severe colour vision disorders may still fly but with restrictions that stop them from operating at night and preclude them from carrying passengers as a professional pilot.

How is my colour vision tested?

The colour vision screening tests used in New Zealand are the various Ishihara Pseudo-Isochromatic Plates (PIPs). These are booklets of coloured plates where applicants are tested by being asked to identify a number or other pattern on each page.

In most cases colour vision is only tested the first time you apply for a new Zealand medical certificate. It is possible for it to need to be tested again, especially if something changes, but this is very unusual.

The pass / fail criteria for the Ishihara PIPs differ between the different types of Ishihara test.

What happens if I pass the Ishihara test?

Passing the Ishihara test means that you meet the colour vision standard. Unless there is some other medical problem, you can expect to be issued a medical certificate if you are able to pass the Ishihara screening test, and you are unlikely to be tested again.

What happens if I fail the Ishihara test?

If you fail the Ishihara screening test it probably means that you have some abnormality of your colour vision. Failing the Ishihara test doesn't provide any detailed information about the nature and severity of your colour vision deficit ... further testing is needed to do that.

Someone who has failed the Ishihara screening test could be issued with a restricted medical certificate without further investigation, but usually further information is sought to identify the nature and severity of the applicant's colour vision deficit.

What further tests are used?

Usually an applicant who fails the Ishihara screening test is referred for a series of colour vision tests. For the CAA's purpose the most important of those other tests are the anomaloscope result, and the Holmes-Wright or Farnsworth lantern test result.

If you pass the Holmes-Wright lantern test (either Type A or B) your colour vision disorder is mild enough for a medical certificate to be issued without any restrictions or conditions. Similarly if you pass the Farnsworth lantern test (with no errors) AND the anomaloscope test shows that your col-

our vision disorder is not of the protan / protanomalous type, then you will also be eligible for the issue of an unrestricted medical certificate.

If you fail any of these further tests then you may still be issued a medical certificate, but it will carry restrictions and endorsements. Those restrictions will prevent, among other things, night flying and instrument flying, and will prevent you from carrying passengers as a professional pilot.

Are the colour vision standards same in every country?

There are international medical standards for the colour vision of pilots. The international medical standards require the “ability to perceive readily those colours the perception of which is necessary for the safe performance of duties”. (See ICAO 6.2.4 *Colour perception requirements* in “Looking at the law” section this document)

Different countries apply those international medical standards in slightly different ways. While New Zealand’s colour vision standards are amongst the most accommodating in the world there are countries who may issue unrestricted medical certificates to some colour vision defective applicants that New Zealand would not.

I already have a medical certificate from another country?

You will still need to have your colour vision assessed according to the New Zealand standards and procedures. If you have a colour vision disorder it is possible that your New Zealand CAA application will have a different outcome to your overseas assessment.

Looking at the law and international standards

ICAO 6.2.4 Colour perception requirements

From Annex 1 to the Convention on International Civil Aviation: Personnel Licensing. International Civil Aviation Organization, tenth edition, July 2006. Chapter 6, Medical provisions for licensing, includes international standards and recommendations 6.2.4 *Colour perception requirements*:

6.2.4.1 Contracting States shall use such methods of examination as will guarantee reliable testing of colour perception.

6.2.4.2 The applicant shall be required to demonstrate the ability to perceive readily those colours the perception of which is necessary for the safe performance of duties.

6.2.4.3 The applicant shall be tested for the ability to correctly identify a series of pseudoisochromatic plates in daylight or in artificial light of the same colour temperature such as that provided by CIE standard illuminants C or D65 as specified by the International Commission on Illumination (CIE).

6.2.4.4 An applicant obtaining a satisfactory result as prescribed by the Licensing Authority shall be assessed as fit. An applicant failing to obtain a satisfactory result in such a test shall be assessed as unfit unless able to readily distinguish the colours used in air navigation and correctly identify aviation coloured lights. Applicants who fail to meet these criteria shall be assessed as unfit except for Class 2 assessment with the following restriction: valid daytime only.

Note.— Guidance on suitable methods of assessing colour vision is contained in the Manual of Civil Aviation Medicine (Doc 8984).

6.2.4.4.1 Recommendation.— Sunglasses worn during the exercise of the privileges of the licence or rating held should be non-polarizing and of a neutral grey tint.

Civil Aviation Rule Part 67: Medical Standards

Rules 67.103, 67.105, and 67.107 include provisions that require an applicant to “have no deficit of colour vision that is of aeromedical significance”.

The details of screening and further testing are found in the medical General Directions (GDs) which can be downloaded from the CAA website.

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