CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

General Directions

Notice of proposed amendment of general directions

Impaired Colour Vision

Reference: GD/VIS/01/2017.1

Issued for consultation pursuant to
Section 27G of the Civil Aviation Act 1990
On 13 September 2017

Background[1]

Authority under which general directions are issued

Under section 27G of the Civil Aviation Act 1990 (the **Act**), the Director of Civil Aviation (the **Director**) may issue general directions in relation to—

- conducting examinations of applicants and licence holders, and reporting the results of those examinations to the Director:
- providing exceptions for temporary medical conditions to the reporting requirements set out in section 27C of the Act:
- specifying the requirements of examinations or other clinical matters, which must be reasonable, including, but not limited to,—
    - the medical content of examinations:
    - the interpretation and analysis of results of examinations:
    - the significance of results of examinations for the purpose of determining whether or not an applicant is eligible for a medical certificate under section 27B of the Act.

Summary of proposed general directions

A detailed summary of the contents of this proposed Impaired Colour Vision GD is enclosed.

Other related proposed general directions

In addition to the Act and Part 67 of the Civil Aviation Rules, the proposed general directions attached to this notice need to be read in conjunction with all other General Directions, including the Civil Aviation (Examination Procedures) General Directions 2009, which—

- provides for the conduct of examinations of applicants and licence holders, and the reporting of the results of those examinations to the Director; and
- specifies the requirements (if any) of examinations or other clinical matters, including,—
    - the medical content of examinations;
    - the interpretation and analysis of results of examinations;
    - the significance of results of examinations for the purpose of determining whether or not an applicant is eligible for a medical certificate under section 27B of the Act.

[1] *This background note and the cover page are included for consultation purposes only and will not form part of the proposed general directions when they are issued.*

Medical manual

All issued general directions must be incorporated in a medical manual issued by the Director.

The medical manual is available on the website of the Civil Aviation Authority.

Submissions

Interested persons are invited to participate in the issue of the proposed general directions by forwarding written submissions to the Consultation Coordinator (contact details below) of the Civil Aviation Authority.

All written submissions will be considered before final action on the proposed general directions is taken. If there is a need to make any significant change to the proposed general directions as a result of the submissions received, then interested persons may be invited to make further submissions.

Inspection of submissions

All written submissions will be available for inspection by interested persons both before and after the closing date for submissions.

Submissions may be inspected by applying to the Consultation Coordinator of the Civil Aviation Authority at Asteron Centre between 9:30am and 4:30pm on weekdays, except statutory holidays.

Privacy Act

Submitters should note that any personal information (as defined in the Privacy Act 1993) contained in, or attached to their submissions will become part of the GD file and will be available for inspection by the public. However any request for copies will be processed by the CAA in accordance with the Privacy Act and the Official Information Act 1982.

Official Information Act

Submitters should note that subject to the Official Information Act 1982 any information attached to submissions will become part of the GD file and will be available to the public for examination.

Submitters should state clearly if there is any information in their submission that is commercially sensitive or for some other reason the submitter does not want the information to be released to other interested parties. The CAA will consider this in making a decision in request of any Official Information Act requests. It should be noted that the CAA cannot guarantee confidentially in respect of any specific submissions.

How to make submissions

A pre-prepared response sheet is included with this NPGD to assist with submissions.

Submissions may be sent by mail, courier, or email to the Consultation Coordinator.

Final date for comments

Comments must be received before 26 October 2017 (six weeks).

Availability of the draft GD:

Any person may obtain a copy of the draft GD from either the CAA website (www.caa.govt.nz) or from the Consultation Coordinator.

Further information

For further information contact the Consultation Coordinator.

GD Consultation Coordinator: contact details

All communications should clearly indicate which GD is the topic, by title or GD reference number.

Mail:	Consultation Coordinator Kate McNabb Civil Aviation Authority PO Box 3555 Wellington 6140 New Zealand
Delivery:	Consultation Coordinator Kate McNabb Asteron Centre 55 Featherston Street Wellington 6011 New Zealand
Phone:	+64 4 560-9400 (international) or 04 560-9400 (domestic)
Email:	Consultation@caa.govt.nz

Enclosures:

1. Description of the general directions proposed. 3 pages.
2. Draft Civil Aviation (Impaired Colour Vision) General Directions 2017. 5 pages.
3. Draft consequential amendments to other Civil Aviation General Directions. 9 pages.
4. Draft consequential amendments to other documents. 4 pages.
5. Impaired Colour Vision flow diagram. 2 pages.
5. General Directions consultation response sheet. 1 page.

Description of the proposed General Directions: Impaired Colour Vision.

This introductory information is not part of the proposed General Directions (GD) proper but is intended as support and explanation to assist with the public consultation process of that GD. The proposed GD itself is those pages with "Proposed Impaired Colour Vision GD" in the page footer.

Contents of this GD

This proposed GD (*Impaired Colour Vision*) is a revision of the similarly named draft GD that underwent public consultation during 2004, 2006, 2009 and 2013 - 2015. The purpose of the revision is to incorporate previous consultation feedback and to update the provisions of the proposed general directions. Changes from the previous versions of this draft GD are:

- the use of the standard (H53.5 ICD-10) term Colour Vision Deficiency where appropriate;
- simplification of the screening and workup of applicants with impaired colour vision;
- inclusion of an option for restricted certification in the absence of further colour vision testing;
- an update of the conditions applied to those Colour Vision Deficient applicants who are issued restricted medical certificates – removal of restrictions relating to the carriage of passengers, night operations or instrument flight as the capacity to undertake these roles is assessed by routine flight testing activities;
- inclusion of additional secondary screening options for all Colour Vision Deficient applicants, including the CAD test and Farnsworth D15 test; and
- a similar approach to screening and workup of applicants with impaired colour vision is applied for each of the three classes of medical certificate. This has allowed the "Decision flow-diagram" for each class to be incorporated into a single flow-diagram.

Other material

Also included in this consultation bundle are:

- An introductory section titled "Proposed Impaired colour Vision GD" containing explanatory material. The pages of this section have "Description of the proposed Impaired Colour Vision GD" in the page footer.
- Proposed consequential amendments to other general directions – The Examination Procedures GD. The pages of this section have "Proposed consequential amendments to other documents" in the page footer.
- Proposed consequential amendments to CAA Advisory Circular AC61-20. The pages of this section have "Proposed consequential amendments to other documents" in the page footer.

- A schematic flow diagram intended as an aid in support of the proposed Impaired Colour Vision GD. This flow diagram is not a part of the GD itself but is enclosed to provide additional guidance and information. The pages of this section have "Flow diagrams for proposed Impaired Colour Vision GD" in the page footer.
- Proposed consequential amendments to CAA MIS 006. The pages of this section have "Proposed consequential amendments to other documents" in the page footer.

How this GD works as an element of the medical certification system

Section 27G(1) of the Civil Aviation Act 1990 provides for the Director to issue general directions in relation to –

(a) conducting examination of applicants and licence holders, and reporting the results of those examinations to the Director; and

(c) specifying the requirements of examinations or other clinical matters, which must be reasonable, including, but not limited to -

(i) the medical content of examinations;

(ii) the interpretation and analysis of results of examinations;

(iii) the significance of results of examinations for the purpose of determining whether or not an applicant is eligible for a medical certificate under section 27B.

Civil Aviation Rule 67.3 includes the definition of the term 'aeromedical significance': "A medical condition is of aeromedical significance if, having regard to any relevant general direction, it interferes or is likely to interfere with the safe exercise of the privileges or the safe performance of the duties to which the relevant medical certificate relates".

Most of the medical standards in Part 67 (civil aviation rules 67.103, 67.105, and 67.107) refer directly or indirectly to a requirement that an applicant have no medical condition that is of aeromedical significance.

This statutory construct allows for general directions (GDs) to be used to describe requirements relating to the 'examinations and other clinical matters' necessary for determining whether an applicant is eligible for the issue of a medical certificate. The Part 67 reference in the medical standards to the GDs, also allows GDs to be used to define how such 'examinations and other clinical matters' can be interpreted (etc) for the purpose of determining whether an applicant meets the medical standards published in the Rules.

This particular GD describes the requirements for the medical certification of applicants who are colour vision deficient. This GD specifies several options for the medical certification of such applicants, and the certification outcomes that apply to each of those options.

By formalising this policy as a GD the administrative processing of most colour vision deficient applicants will reside under section 27B(1) of the Act and, as such, will be able to be undertaken directly by a delegated medical examiner rather than requiring direct CAA involvement and an 'AMC' (Accredited Medical Conclusion) and the application of statutory flexibility under section 27B(2) of the Act.

This GD introduces the City of London Colour Assessment and Diagnosis (CAD) colour vision test and the Farnsworth D15 test as secondary screening options, both of which are used by other regulatory authorities.

The GD also updates the restrictions that are applied to those who fail initial screening and then either fail, or elect to not undertake, secondary screening. Restrictions against the carriage of passengers (class 1), night flying (class 1 and 2) and instrument flying (class 1 and 2) are removed. The body of clinical and empirical evidence considered by the CAA during the development of this GD supports the removal of these restrictions.

Such was the significance of material considered in the development of this GD, the CAA established a Colour Vision Deficiency GD Assessment Panel comprising specialists in aviation medicine, vision science, general aviation, airline operations, regulatory oversight and law. The panel considered written and verbal submissions from various international contributors and experts, empirical evidence and clinical research relating to colour vision deficiency in pilots. Noting that current clinical test methods and restrictions result in significant limitations for some applicants who would be able to operate unrestricted in some other jurisdictions, the panel produced a report recommending the adoption of a practical demonstration of competency as well as alternative secondary screening tests, such that these individuals may demonstrate their competency. These recommendations were accepted by the Director with the exception of the practical flight.

Rather than requiring a one-time flight test to assess individuals for the effect of their colour vision deficiency on all aspects of flying, pilots will instead progress through the standard programme of training and flight testing, applicable to the privileges they seek. They will then be required to further repeatedly demonstrate competency during subsequent renewals of their privileges alongside all other pilots. Evidence indicates that such practical assessments are an appropriate means for pilots with colour vision deficiency to demonstrate their ongoing ability to perform the tasks required of their particular piloting role.

Civil Aviation (Impaired Colour Vision) General Directions Notice 2017

Pursuant to section 27G of the Civil Aviation Act 1990, the Director, after having consulted the persons, health professionals with aviation medical experience, representative groups within the aviation industry or elsewhere, government departments, and Crown agencies that the Director considers appropriate, gives the following notice.

Contents

[INSERT CONTENTS SECTION HERE]

General Directions

1. Title

These general directions are the Civil Aviation (Impaired Colour Vision) General Directions 2013.

2. Commencement

These general directions come into force on [DATE].

3. Purpose

The purpose of these general directions is to specify the requirements for examinations or other clinical matters, for applicants who have, or may have, any colour vision deficiency, including, but not limited to,—

(a) the medical content of examinations:

(b) the interpretation and analysis of results of examinations:

(c) the significance of results of examinations for the purpose of determining whether or not an applicant is eligible for a medical certificate under section 27B of the Act.

4. Interpretation

(1) In these general directions, unless the context otherwise requires,—

Act means the Civil Aviation Act 1990:

applicant means an applicant for a class 1, class 2, or class 3 medical certificate issued under Part 2A of the Act:

impaired colour vision, in relation to an applicant, means a colour vision deficiency (or deficit of colour vision) that results in the applicant failing the colour vision screening examination (Ishihara):

medical certificate means a medical certificate—

(a) issued by the Director under Part 2A of the Act to an applicant or licence holder; or

(b) recognised by the Director under the rules:

rules means the Civil Aviation Rules.

(2) A term or expression that is defined in the Act, the Civil Aviation Rules, or the Civil Aviation (Examination Procedures) General Directions Notice and used but not defined in these general directions has the same meaning as in the Act, the Civil Aviation Rules, or the Civil Aviation (Examination Procedures) General Directions Notice.

5. Status of examples and notes

(1) An example or note used in this notice is only illustrative of the provision to which it relates. It does not limit the provision.

(2) If an example or a note and the provisions to which it relates are inconsistent, the provision prevails.

Part 1
Class 1, 2, and 3 medical certificates

Subpart 1 - Impaired colour vision

6. Interpretation of discrepant results

(1) Colour vision screening must be undertaken as required by the Civil Aviation Timetable for Routine Examinations General Directions Notice 2009.

(2) If there is a significant discrepancy between the results of a recent vision examination and any past colour vision examinations then the medical examiner should resolve the discrepancy by —

(a) consulting the applicant's CAA medical file to assist in determining which results should be relied upon; or

(b) seeking further colour vision examinations to assist in determining which results should be relied upon.

7. Screening an applicant with a colour vision deficiency that has become apparent since applicant's last colour vision screening examination (Ishihara)

(1) If, since the applicant's last colour vision screening examination (Ishihara), an applicant's medical condition has changed in any way that suggests the presence of a colour vision deficiency that may be of aeromedical significance, then the medical examiner must consider the results of a colour vision screening examination (Ishihara) undertaken since the change in the applicant's medical condition.

Note

It is relatively rare for colour vision status to change. However medical conditions such as diabetic (or other) retinopathy, the use of some medications, or the implantation of intraocular lenses can lead to a change in colour vision status.

(2) Subclause (1) applies despite anything to the contrary in the—

(a) Civil Aviation (Timing for Routine Examinations) General Directions Notice; or

(b) Civil Aviation (Examination Procedures) General Directions Notice.

8. Relevant colour vision screening examination (Ishihara) results to interpret and analyse

For the purpose of these general directions the determination of whether an applicant has impaired colour vision relies on the interpretation and analysis of the results of a colour vision screening examination (Ishihara) undertaken by the applicant. The medical examiner must consider the most recent colour vision screening examination (Ishihara), but should not ignore or discount any previous colour vision screening examinations (Ishihara) undertaken by the applicant.

9. Relevant non-routine examination results to interpret and analyse

If an applicant has impaired colour vision, the medical examiner must either assess the applicant as described in clause 10(3), or analyse and interpret the results from the most recent test undertaken by the applicant according to the following—

(a) Holmes-Wright lantern type A or Type B colour vision test; or

(b) Farnsworth lantern (FALANT) colour vision test and Anomaloscope (Nagel or Neitz) colour vision test; or

(c) Colour Assessment and Diagnosis (CAD) colour vision test; or

(d) Farnsworth D15 test.

Refer to the *Examination Procedures* GD for test details.

10. Significance of examination results

(1) If the applicant has impaired colour vision and passes any of the tests in clause 9, the medical examiner may assess the applicant as having a colour vision deficiency that is not of aeromedical significance.

(2) If the applicant has impaired colour vision and:

(a) fails the Holmes-Wright lantern colour vision test; or

(b) fails the Farnsworth lantern (FALANT) colour vision test; or

(c) passes the Farnsworth lantern (FALANT) colour vision test and has any result indicating a colour vision deficiency that is either protanopic or protanomalous in nature; or

(d) fails the CAD test; or

(e) fails the Farnsworth D15 test;

the medical examiner must assess the applicant as described in paragraph (3).

(3) An applicant who either:

(a) does not undertake the further colour vision testing as described in clause 9; or

(b) fails the further colour vision testing as described in paragraph (2);

must be assessed as follows —

Class 1 and Class 2

Assess the applicant for a class 1 and class 2 medical certificates as having a colour vision deficiency that is not of aeromedical significance provided the medical certificate is issued with the following restriction —

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

Class 3

Assess the applicant for a class 3 medical certificate as having a colour vision deficiency that is of aeromedical significance.

Subpart 2 - Information required for AMC

11. Information to be made available for AMC

If the medical examiner assesses the applicant as not meeting the medical standard prescribed in rule 67.103(m)(5), 67.105(m)(5), or 67.107(m)(5) and the medical

examiner elects to consider the application further under the flexibility provisions of section 27B of the Act, the medical examiner:

(a) must ensure that the results of all of the colour vision examinations considered by the medical examiner are made available for the purposes of reaching an accredited medical conclusion (AMC); and

(b) should consider providing the results of the following, or other similar, additional colour vision tests undertaken by the applicant are made available for the purposes of reaching an accredited medical conclusion (AMC) -

(i) Holmes-Wright lantern colour vision test;

(ii) Farnsworth lantern (FALANT) colour vision test and anomaloscope (Nagel or Neitz) colour vision test;

(iii) CAD test;

(iv) Farnsworth D15 test.

Note

Detailed information concerning the various colour vision tests mentioned above can be found in the Civil Aviation (Examination Procedures) General Directions Notice.

Consequential amendments to other General Directions

Civil Aviation (Examination Procedures) General Directions Notice

The following provisions are intended for insertion into:

(1) Part 1 Purpose and interpretation, Section 5, of the of the Civil Aviation (Examination Procedures) General Directions Notice.

(2) Part 2, Schedules 1 and 13, of the Civil Aviation (Examination Procedures) General Directions Notice.

The following provisions are intended for insertion into the Civil Aviation (Examination Procedures) General Directions Notice.

Part 1 Purpose and interpretation

Replace section 5 of Part 1 with the following text.

5 Applicant proof of identity

(1) For the purpose of the routine examinations and non-routine examinations described by these general directions, and where an applicant is required to produce evidence of his or her identity, the following photographic identity documents are acceptable for that purpose:

(a) a current New Zealand passport;

(b) a current New Zealand driver licence;

(c) a current photographic identity card issued by the New Zealand Defence Force, New Zealand Police or the New Zealand Fire Service;

(d) a current CAA airport identity card;

(e) a valid and current passport or national identity document issued by another country.

(2) An equivalent alternative form of photographic identification, not listed above, may also be acceptable to the Director (Refer AC 67-1).

Part 2 Examination procedures

Schedule 1 Routine examinations

Section 11: Colour vision screening examination (Ishihara)

Replace section 11 of Schedule 1 with the following text.

11.1 Definition

11.1.1 The Colour vision screening examination (Ishihara) is a screening examination of colour vision function. Screening is undertaken as required by the Civil Aviation Timetable for Routine Examinations General Directions Notice 2009.

11.1.2 The Colour vision screening examination (Ishihara) employs the Ishihara pseudo-isochromatic plate set. A variety of plate sets may be used: 14 or 16 –plate edition; 24 or 26 -plate edition; 32 or 36 or 38 –plate edition. Each plate set comprises:

(a) an introductory numerical plate that both normal and colour defective individuals are able to read;

(b) a number of adult test plates that require the reader to identify a numeral from amongst the differently coloured and sized circles;

(c) a number of plates where the reader is asked to trace a winding line, between two points, from amongst the differently coloured and sized circles.

11.1.3 There are different pass-fail criteria for the different plate sets.

11.2 Conduct of examination

11.2.1 An applicant who undertakes a colour vision screening examination (Ishihara) must produce evidence of their identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these general directions.

11.2.2 A medical examiner must ensure that the colour vision screening examination (Ishihara) is conducted in accordance with —

(a) the manufacturer's instructions for the Ishihara plate set used; or

(b) any other equivalent published standard that is acceptable to the Director.

11.2.3 Unless specified otherwise in the manufacturer's instructions the medical examiner must ensure that the colour vision screening examination (Ishihara) is conducted —

(a) in daylight conditions or under illuminate D65 conditions (as provided by a Philips 96 fluorescent tube light);

(b) with each plate presented perpendicular to the applicant's line of sight, and at a distance of greater than 75 cm from the applicant's eyes (beyond the applicant's fingertips);

(c) with the plates presented to the applicant in random order.

11.2.4 The medical examiner must test the applicant with all of the adult numerical test plates contained within the plate set used.

11.3 Interpretation of results

11.3.1 The results of the colour vision screening examination (Ishihara) are interpreted as a pass when:

(a) the applicant makes no errors on the adult numerical test plates of a 14 or 16 –plate Ishihara plate set; or

(b) the applicant makes 2 or less errors on the adult numerical test plates of a 24 or 26 –plate Ishihara plate set; or

(c) the applicant makes 3 or less errors on the adult numerical test plates of a 32 or 36 or 38 –plate Ishihara plate set.

Note
For the post-1980 versions of the 24-plate Ishihara test the adult numerical test plates are plates number 2 – 15, and plate number 1 is the introductory or demonstration numerical plate.

11.3.2 Otherwise the results of the colour vision screening examination (Ishihara) are interpreted as a fail.

11.4 Reporting requirements

11.4.1 The medical examiner must ensure that any plate numbers that the applicant has identified incorrectly are recorded in the appropriate place in the report required under section 27D of the Act (form CAA 24067/002).

11.4.2 The document produced by an applicant as evidence of his or her identity must be recorded on the report that under section 27D(1) of the Act records the results of the colour vision screening examination (Ishihara).

11.5 Period of validity of results

11.5.1 The results of a colour vision screening examination (Ishihara) are valid for a period of one year from the date of the examination. Screening is undertaken as required by the Civil Aviation Timetable for Routine Examinations General Directions Notice 2009.

Schedule 13 Non-routine examinations: Vision

Replace the contents of Schedule 13 with the following text.

Section 1: Anomaloscope (Nagel or Neitz) colour vision test

3.1 Definition

3.1.1 The Anomaloscope (Nagel or Neitz) colour vision test is an examination of colour vision function.

3.1.2 These are colour matching tests that require the subject to adjust the amount of red and green light required to match a static yellow light. Anomaloscopes are the gold standard for diagnosis of protan and deutan colour vision deficiencies.

3.2 Conduct of examination

3.2.1 An applicant who undertakes an anomaloscope (Nagel or Neitz) colour vision test must produce evidence of their identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these general directions.

3.2.2 A medical examiner must ensure that the anomaloscope (Nagel or Neitz) colour vision test is conducted in accordance with —

(a) the manufacturer's instructions for the anomaloscope (Nagel or Neitz) colour vision test; or

(b) any other equivalent published standard that is acceptable to the Director.

3.3 Interpretation of results

3.3.1 There are no pass or fail criteria for interpretation of the results of an anomaloscope (Nagel or Neitz) colour vision test. The results of the anomaloscope (Nagel or Neitz) colour vision test are to be interpreted as to the

nature (*protan* or *deutan* etc) and severity of the subject's colour vision deficiency.

3.4 Reporting requirements

3.4.1 The results of the anomaloscope (Nagel or Neitz) colour vision test must be reported in a manner that clearly indicates the severity and nature (e.g. +3 deutan) of the subject's colour vision deficiency.

3.5 Period of validity of results

3.5.1 The results of an anomaloscope (Nagel or Neitz) colour vision test are valid for an indefinite period unless there is any clinical suggestion that the applicant's colour vision deficiency may have changed.

Section 2: Farnsworth lantern (FALANT) colour vision test

6.1 Definition

6.1.1 The Farnsworth lantern (FALANT) colour vision test is an examination of colour vision function.

6.1.2 The Farnsworth lantern (FALANT) colour vision test is a two-light colour naming test employing red, green, and white lamps. The subject is asked to identify the colour of each of the two lights (using only the colour names "red", "green", and "white") as they are presented.

Note
The use of the Stereo Optical OPTEC 900 lantern is an acceptable alternative to the Farnsworth lantern for the purposes of the Farnsworth lantern (FALANT) colour vision test.

6.2 Conduct of examination

6.2.1 An applicant who undertakes a Farnsworth lantern (FALANT) colour vision test must produce evidence of his or her identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these general directions.

6.2.2 A medical examiner must ensure that a Farnsworth lantern (FALANT) colour vision test is conducted in accordance with —

(a) the manufacturer's instructions for the Farnsworth lantern (FALANT) colour vision test device; or

(b) any other equivalent published standard that is acceptable to the Director.

6.3 Interpretation of results

6.3.1 An error is recorded in the Farnsworth lantern (FALANT) colour vision test if there is a mistake in naming either or both of the colours in the pair that is presented. A second and third run of nine presentation is only required if the subject makes one or more errors on the initial run. The average error score is the

mean of the error scores made during the second and third run of nine presentations.

6.3.2 The results of the Farnsworth lantern (FALANT) colour vision test are interpreted as a pass if:

(a) there are no errors during the initial run of nine presentations; or

(b) there are errors during the initial run of nine presentations, and there is an average error score of 1.0 or less during the second and third run of nine presentations.

6.3.3 Otherwise the results of the Farnsworth lantern (FALANT) colour vision test are interpreted as a fail.

6.4 Reporting requirements

6.4.1 The results of the Farnsworth lantern (FALANT) colour vision test must be reported in a manner that clearly indicates whether the subject passed or failed the test. The results should also specify the nature and number of any errors made.

6.5 Period of validity of results

6.5.1 The results of a Farnsworth lantern (FALANT) colour vision test are valid for an indefinite period unless there is any clinical suggestion that the applicant's colour vision deficiency may have changed.

Section 3: Holmes-Wright lantern colour vision test

7.1 Definition

7.1.1 The Holmes-Wright lantern colour vision test is an examination of colour vision function.

7.1.2 The Holmes-Wright lantern colour vision test is either a two-light or three-light colour naming test employing red, green, and white lamps. The subject is asked to identify the colour of each of the lights (using only the colour names "red", "green", and "white") as they are presented.

Note
The Holmes-Wright lantern Type A or Type B is acceptable for performance of the Holmes-Wright lantern colour vision test.

7.2 Conduct of examination

7.2.1 An applicant who undertakes a Holmes-Wright lantern colour vision test must produce evidence of their identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these general directions.

7.2.2 A medical examiner must ensure that a Holmes-Wright lantern colour vision test is conducted in accordance with —

(a) the manufacturer's instructions for the Holmes-Wright lantern colour vision test device; or

(b) any other equivalent published standard that is acceptable to the Director.

7.3 Interpretation of results

7.3.1 An error is recorded in the Holmes-Wright lantern colour vision test if there is a mistake in naming any of the colours that is presented. A second run of nine presentation is only required if the subject makes one or more errors on the initial run.

7.3.2 The results of the Holmes-Wright lantern colour vision test are interpreted as a pass if:

(a) there are no errors during the initial run of nine presentations; or

(b) there are errors during the initial run of nine presentations, and there are no errors during the second run of nine presentations.

7.3.3 Otherwise the results of the Holmes-Wright lantern colour vision test are interpreted as a fail.

7.4 Reporting requirements

7.4.1 The results of the Holmes-Wright lantern colour vision test must be reported in a manner that clearly indicates whether the subject passed or failed the test. The results should also specify the nature and number of any errors made.

7.5 Period of validity of results

7.5.1 The results of a Holmes-Wright lantern colour vision test are valid for an indefinite period unless there is any clinical suggestion that the applicant's colour vision deficiency may have changed.

Section 4: Colour Assessment and Diagnosis (CAD) (City of London) colour vision test

8.1 Definition

8.1.1 The *Colour Assessment and Diagnosis* (CAD)(City of London) colour vision test is an examination of colour vision function that provides detailed assessment of red / green and yellow / blue colour perception.

8.1.2 The CAD test isolates the use of colour signals and requires the applicant to report the direction of moving colour-defined pattern displayed on a calibrated visual screen. The moving test pattern changes randomly in colour, saturation and motion direction. The test cannot be learnt.

8.2 Conduct of examination

8.2.1 An applicant who undertakes a CAD colour vision test must produce evidence of his or her identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these general directions.

8.2.2 A medical examiner must ensure that a CAD colour vision test is conducted in accordance with —

(a) the manufacturer's instructions for the CAD colour vision test device; or

(b) any other equivalent published standard that is acceptable to the Director.

8.2.3 The CAD test may be undertaken including any of the options and settings available (e.g. 'screen', 'environment', or 'certification'), but must include the Full (Definitive) option which identifies the class of colour vision involved (i.e., normal trichromacy, deutan or protan-like deficiency or acquired deficiency) and quantifies the severity of red / green and yellow / blue loss.

8.2.4 If the RG threshold result falls in the range of 4.8 – 7.2SN (inclusive) for deutan deficiency and 9.6 – 14.4SN (inclusive) for protan deficiency, then the definitive CAD test must be repeated three more times. This option is offered automatically by the program. If the RG threshold result is outside those ranges no repeats are necessary.

8.3 Interpretation of results

8.3.2 The results of the definitive CAD colour vision test are interpreted as a pass if and only if:

(a) the final 'definitive' result is less than 6SN (Standard Normal CAD units) for a deutan type defect; or

(b) the final 'definitive' result is less than 12SN (Standard Normal CAD units) for a protan type defect.

8.3.3 Otherwise the results of the CAD colour vision test are interpreted as a fail.

8.4 Reporting requirements

8.4.1 The results of the CAD colour vision test must be reported in a manner that clearly indicates whether the subject passed or failed the test. The results should also specify the number of test runs performed in the event that repeats were undertaken.

8.5 Period of validity of results

8.5.1 The results of a CAD colour vision test are valid for an indefinite period unless there is any suggestion that the applicant's colour vision deficiency may have changed, or the results of the CAD test may be otherwise invalid.

Section 5: Farnsworth D15 colour vision test

9.1 Definition

9.1.1 The Farnsworth D15 test is one of the most widely used hue discrimination tests. It will identify moderate and severe protans, deutans and tritans. The test is based on colour confusion: protans confuse certain reds and greens; deutans confuse other reds and greens.

9.1.2 It consists of 15 moveable matt colour samples, selected from an incomplete hue circle, placed in a box with one fixed colour sample. The colour samples are held in circular caps that subtend 1.5° at a test distance of 0.5 m. The colours range from blue through blue-green, yellow-green, yellow, orange and red to red-purple. The moveable caps are numbered on the backs according to the ideal colour circle. The level of difficulty of the test is such that a person who fails the test will have difficulty distinguishing surface colour codes.

9.2 Conduct of examination

9.2.1 An applicant who undertakes a Farnsworth D15 colour vision test must produce evidence of his or her identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these general directions.

9.2.2 For the test, all the colour caps, except the reference colour, are removed from the box and mingled on the table in front of the subject. The subject is then asked to put the caps back in the box in what they perceive to be a natural colour order, starting from the one fixed reference cap, so having to find the coloured cap that looks most like the colour of the cap already in the box and put it next to it. They then carry on from there finding the colour nearest to the last one placed in the box until the last cap is used. They are asked to look again at the finished order, when all the caps are in the box, to see if they want to make any changes.

9.2.3 Unless specified otherwise in the manufacturer’s instructions, the medical examiner must ensure that the Farnsworth D15 test is conducted —

in daylight conditions or under illuminate D65 conditions (as provided by a Philips 96 fluorescent tube light).

9.3 Interpretation of results

9.3.1 After the final review of the order by the subject, the examiner records the number order on the back of the caps. The results are then transferred to the results diagram. A line is drawn joining the cap numbers as arranged by the subject. As all the colours are presented at the same time, isochromatic colour confusions are demonstrated when colours from opposite sides of the hue circle are mingled in the subject's arrangement. The record sheet provides an aid to interpretation by illustrating the direction of lines representing typical isochromatic confusions in protan, deutan and tritan colour deficiency.

9.3.2 One transportation of adjacent colours indicates a minor error or 'normal' confusion. Caps that are placed on the wrong side of the hue circle are considered a major error. People with normal colour vision and slight colour deficiency pass, and typical results are obtained in moderate/severe protan, deutan and tritan deficiency. The number of isochromatic confusions made is used to identify the two grades of deficiency, moderate and severe.

9.3.3 Axes on the scoring sheet parallel the protan, deutan and tritan axes and indicate the sort of deficit involved. Caps which are placed on the wrong side of the circle are considered a major error. Caps placed in an adjacent position on the same side of the circle indicate a minor error or normal confusion. Two minor errors are considered to be within normal limits. Dichromats and extreme anomalous trichromats will produce six to twelve major errors. The test is failed if there are two or more major errors.

9.4 Reporting requirements

9.4.1 The results of the Farnsworth D15 colour vision test must be reported in a manner that clearly indicates whether the subject passed or failed the test. The results should also state the number of major errors made and the sort of deficit, as indicated by the axes crossed.

9.5 Period of validity of results

9.5.1 The results of a Farnsworth D15 colour vision test are valid for an indefinite period unless there is any clinical suggestion that the applicant’s colour vision deficiency may have changed.

Consequential amendments to other Documents

Civil Aviation Advisory Circular AC 61-20

The paragraph regarding colour vision in **AC 61-20**, entitled "Rule 61.357(b)(4)(iv) Colour Vision" is amended as highlighted below:

Rule 61.357(b)(4)(iv) Colour Vision

A pass in the Ishihara colour vision screening ~~test~~ examination is acceptable to the Director for the holder of an RPL to operate into or out of a controlled aerodrome. ~~Pilots who have previously held a class 1 or 2 medical certificate are deemed to meet this colour vision requirement~~. A pilot who fails the Ishihara colour vision screen examination but has a pass in any of the non-routine colour vision tests as described in the (Examination Procedures) General Directions (GD) is acceptable to the Director for the holder of an RPL to operate into or out of a controlled aerodrome.

A pilot who fails the Ishihara colour vision screening examination and does not undertake any further colour vision testing, or who fails further non-routine colour vision testing as described in the (Examination Procedures) GD, may not operate in and out of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control.

Notes: *Under rule 61.303, an RPL does not qualify the holder for the issue of a flight instructor rating. Therefore, a flight instructor rating cannot be endorsed on an RPL.*

A person holding a flight instructor rating endorsed on a CPL or ATPL may not exercise the privileges of that instructor rating with an RPL.

Civil Aviation Authority Medical Information Sheet 006

CAA MIS 006 to be updated as revision 2 as per below:

CAA Colour Vision Deficiency - MIS 006

What is colour vision deficiency?

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 a smaller proportion (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.

A greater proportion of the male population is affected as congenital CVD is genetically transferred on the X chromosome. Symptoms only become apparent when the full complement of X chromosomes is affected. Males have only a single X chromosome and so have a greater probability of developing symptoms than females.

CVD may also be acquired as a result of some medical conditions such as diabetes, some drugs or eye degeneration or surgery.

How is colour vision tested?

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 the first time you apply for 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 test differ between the different types of 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 and are unlikely to be tested again.

If you fail the Ishihara screening test it may mean that you have CVD. Failing the Ishihara test doesn't provide any detailed information about the nature and severity of a 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. This may be achieved using the Holmes Wright lantern, Farnsworth lantern, CAD test or Farnsworth D15 test. If any one of these tests is passed the candidate will receive an unrestricted medical certificate. Otherwise, the candidate will receive a medical certificate which includes a restriction that prevents them operating to and from controlled aerodromes without a radio.

Can colour vision deficient pilots fly in New Zealand?

CAA NZ approach to assessing CVD pilots is one that constitutes both medical assessment and practical competency assessment.

Pilots with the mildest forms of CVD are eligible for unrestricted medical certification in New Zealand. Those with more severe CVD may still fly but with a restriction that prevents them operating to and from controlled aerodromes without a radio. This is necessary because, without a radio, the control tower may use colour light signals to communicate with aircraft.

If you are a CVD pilot who requires the imposition of the restriction detailed above on their medical certificate, you will then enter the flight training system where your ability to operate the aircraft safely will be assessed like all other pilots.

Is there a risk in starting pilot training with CVD?

All pilots, once they have their medical, must progress through a programme of training, examinations and practical flight tests. The training and flight tests are tailored to the nature of flying that an individual will undertake. For example, a student first trains and is then tested for private pilot privileges. They may then progress onwards through training and testing for night flying privileges, commercial pilot privileges, flight in instrument meteorological conditions, specific aircraft type ratings and so on.

For every person that starts pilot training there is a risk that they will not progress beyond a certain level. For some this is a choice, while for others it may be because of accidents or medical conditions that arise, cognitive ability, academic ability or any one of a number of reasons.

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.

If you are concerned about the impact of your CVD on your ability to operate the aircraft safely and progress through the flight training system, then it is recommended that you discuss your condition with your flying instructors and flight examiners who can then identify any concerns early in your flying career.

Are colour vision standards the 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.

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?

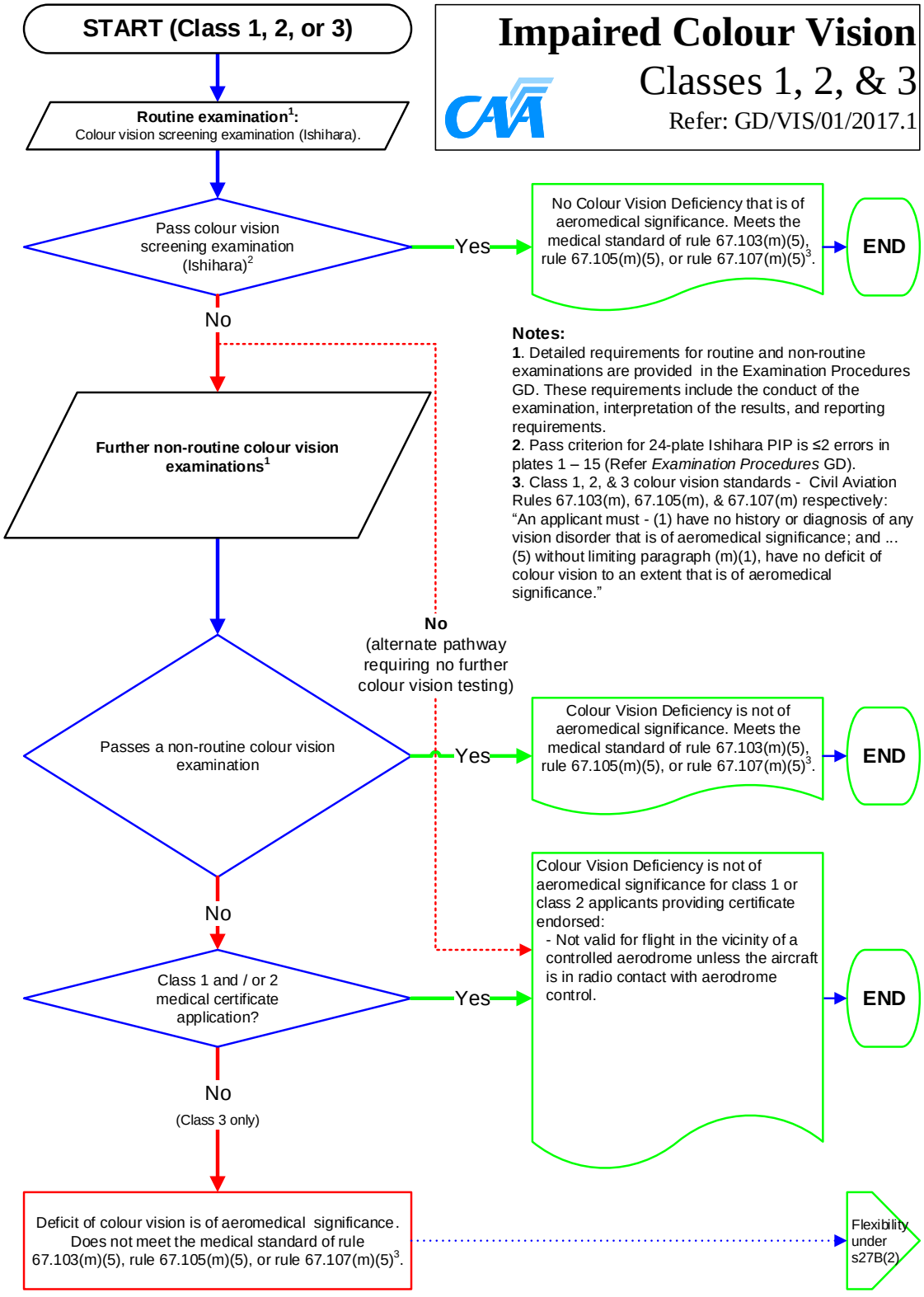
You will still need to have your colour vision assessed according to the New Zealand standards and procedures. If you have CVD it is possible that your New Zealand CAA application will have a different outcome to your overseas assessment.

Flow diagrams

The following flow diagrams are not a part of the Civil Aviation (Impaired Colour Vision) General Directions but are intended as guidance material to assist medical examiners in their utilisation of the general directions.

This flowchart was corrected on 21/09/2017 to ensure text displays correctly

Classes 1, 2, & 3 *Impaired Colour Vision* flow diagram



This flow diagram is intended to provide Medical Examiners with support and guidance in their utilisation of the General Directions. This flow diagram should never be interpreted in isolation and should always be used with reference to the appropriate General Directions. Nothing in this flow diagram should be interpreted in any way that is contrary to the provisions of the General Directions, the Civil Aviation Rules, or the Civil Aviation Act 1990.

Decision flow-diagram: GD/VIS/01/2017.1 Classes 1, 2, & 3 of [DATE] 2017

General Directions Consultation Response Sheet

Impaired Colour Vision, GD/VIS/01/2017.1

Please return this response sheet by the due date to the Consultation Coordinator:
Email - Consultation@caa.govt.nz; Post – PO Box 3555, Wellington, 6140.

Please indicate your acceptance or otherwise of the proposal by ticking [✓] the appropriate box below. Any additional constructive comments, suggested amendments or alternative action will be welcome and may be provided on this response sheet or by separate correspondence.

[ ] The proposal is acceptable without change.

[ ] The proposal is acceptable but would be improved if the following changes were made:

[ ] The proposal is not acceptable but would be acceptable if the following changes were made: (Please provide explanatory comment and use additional pages if required)

[ ] The proposal is <u>not acceptable under any circumstance:</u>.
(Explanatory comment must be provided using additional pages if required)

Your name, organisation, client number, and address, phone, facsimile, and e-mail:

Date: _____

Number of pages attached [ ]