Aviation ophthalmology

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Mexico City,
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Plan

• Visual acuity
• Spectacle prescription
• Peripheral fields
• (Colour vision) – Dr Staff
• Cases
6.3.3 Visual requirements

- 6.3.3.2 Distant visual acuity with or without correction shall be 6/9 or better in each eye separately, and binocular visual acuity shall be 6/6 or better. No limits apply to uncorrected visual acuity. Where this standard of visual acuity can be obtained only with correcting lenses, the applicant may be assessed as fit provided that:
  - a) such correcting lenses are worn during the exercise of the privileges of the licence or rating applied for or held; and
  - b) in addition, a pair of suitable correcting spectacles is kept readily available during the exercise of the privileges of the applicant’s licence.
Visual acuity

Myopia or hypermetropia?
Visual acuity

Myopia or hypermetropia?
Visual acuity

Myopia

6/6 = ?
20/20 = ?
Visual acuity

Hypermetropia
Spectacle prescription

### Distance (general purpose) prescription

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<th>Axis</th>
<th>Prism</th>
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### Reading prescription

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### Distance & Reading prescription written in 'reading addition' form

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### Distance & Reading prescription written in full

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Cases

- Airline pilot, 55 years, 12,000 hours, firework accident
  - Distant VA: R = 6/5, L = 6/60
- Class 1 applicant, 23 years
  - Spectacle prescription:
    - R = -7.5, L = -6.5
    - R = + 7.5, L = + 6.5
Visual fields

“3.3.5 The applicant shall be required to have normal fields of vision”.
Visual fields
Cases

• 35 year old first officer. Myopic – 4.5 dioptres both eyes. Retinal detachment right eye March 2008. Treated by laser therapy – stable right upper quadrant visual field deficit in right eye. Left eye normal. Central vision in each eye = 6/5
Cases

• Class 1 applicant, 23 years
  – Spectacle prescription pre-LASIK:
    • R = -7.5, L = -6.5
    • R = + 7.5, L = + 6.5
  – Spectacle prescription 12 months post-LASIK
    • R = - 1.5, L= -1.0, stable, no post-op complications
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Colour vision
ICAO C-V Standards

- 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.
ICAO C-V Standards

- 6.2.4.3 The applicant shall be tested for the ability to correctly identify a series of pseudoisochromatic plates.

- 6.2.4.4 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.
JAR requirements

- Pass Ishihara test or (if failed);
- Pass Nagel anomaloscope or;
- Pass a lantern test such as:
  Holmes-Wright, Beyne, Spectrolux
Ishihara Test (24 plate version - only first 15 plates tested)

Pass criteria

• JAR - first 15 plates read normally
• Ishihara - 13 or more plates read normally
• Australia/New Zealand/Canada – 13 or more plates read normally
• FAA - 9 or more plates read normally

• JAR pass very stringent: normals can have ‘misreadings’
Nagel anomaloscope

- ‘Gold standard’ for diagnosis/quantification of red-green colour deficiency
- Colour matching: $R + G = Y$

Red (670nm) + Green (546nm) = Yellow (589nm)
Holmes-Wright, Type A
9 pairs of lights: R,G,W
Spectrolux: 12 pairs of lights R,G,W
Beyne: 5 single lights: R,G,W,B,Y/O
Summary

- Vision requirements are provided in Annex 1
- Perfect vision is not required for safe flight
- High refractive errors are acceptable if adequately corrected
- Colour vision requirements need to be specific and applied consistently