FSG 400-01
AIRCREW VISUAL REQUIREMENTS

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REFERENCES:

A. CFP 154 Medical Standards for the Canadian Forces
B. CFAO 34-44 Periodic Health Examination and Medical Administration – Aircrew
C. AMA Directive 100-01 Medical Standards for CAF Aircrew
D. CFHS Instruction 4020-03 Optical Supply and Services: Entitlement to Contact Lenses
E. CANFORGEN 69/08 Laser (Eye) Refractive Surgery in CF Aircrew
F. AMA Directive 400-02 Laser Refractive Surgery for CF Aircrew
G. CFHS Instruction 4000-16 Periodic Health Assessment – Aircrew
H. CFHS Instruction 4000-01 Periodic Health Assessments

RECORD OF AMENDMENTS:

Date (DD/MMM/YY)	Reason for Change
29 Apr 19	Update to allowable refractive errors for Group A and B aircrew (para 10, table I), and related standards for Laser Refractive Surgery (para 27)
02 Oct 24	General review of wording and flow of document, with improvements made. Sections added or updated to provide guidance on: Acquired Colour Vision Deficiency (para 11), Keratoconus (paras 16-19), Peripheral Retinal Degenerations and Retinal Breaks (paras 25-35), Polarized Lenses (para 45), Transition Lenses (para 46), and Multifocal and Progressive lenses (paras 47-48). Annex B of previous versions updated and reformatted to be Appendix 1 of Annex A, Appendix 2 of Annex A added, and Annex B and its appendices added.

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GENERAL INFORMATION

1. This guideline represents the concurrent consensus of the Aerospace and Undersea Medical Board (AUMB) including Commanding Officer of Canadian Forces Environmental Medicine Establishment (CFEME), 1 Canadian Air Division Surgeon (1 CAD Surg), and the RCAF Surgeon. Variation from this guideline should occur only after obtaining appropriate aeromedical advice from CFEME or 1 CAD Surg/ASCS (Aeromedical Standards and Clinical Services). This guideline should be read in conjunction with ref C that further elaborates on diseases of the eye which may be disqualifying for aircrew and is the primary reference for periodicity of aircrew eye examinations.

AIRCREW EYE EXAMINATIONS

2. Aircrew eye examinations may be done by an ophthalmologist or an optometrist. CFHS clinics should endeavour to establish a referral relationship with a local optometrist or ophthalmologist, provide access to this and other documents, and monitor consultations to confirm all requirements are consistently and appropriately completed; this relationship may also enable timely access.

3. Aircrew eye examinations should include a thorough clinical assessment and must include the following elements, with the results of each clearly documented. DND 2776 - Visual Acuity for Initial Aircrew Form (see Appendix 1 of Annex A) must be utilized for this purpose. The entirety of Annex A, and its appendices, should be shared with the local optometrist/ophthalmologist at time of assessment.

a. Near and distant visual acuity, corrected and uncorrected;

b. Refraction:

(1) In conjunction with an Initial Aircrew PHA for all aircrew MOSIDs or occupational specialties (including a change from one aircrew MOSID to another), a cycloplegic refraction is required on initial aircrew eye examination; and

(2) For subsequent examinations after an Initial Aircrew PHA (excepting a change from one aircrew MOSID to another), a manifest refraction may be done in lieu of cycloplegic refraction;

c. Ocular muscle balance, measured at 6 m and at 30-50 cm with the individual wearing the correction required for these distances and with measurement in prism diopters of any horizontal and vertical heterophoria using the alternate cover test or Maddox rod;

d. Slit lamp exam

e. Intraocular pressures, with referral to an ophthalmologist for full glaucoma assessment if identified as a glaucoma suspect (and, ideally, completion of

this assessment prior to sending file to CFEME in the case of Initial Aircrew PHA);

f. Dilated fundus exam with documentation of lattice or other retinal changes;

g. Visual fields by confrontation, with automated visual fields testing if clinically indicated; and

h. Near stereopsis measured in sec/arc.

4. Reports received with incomplete documentation should be returned to the consultant to be fully completed. These requirements are also detailed at Annex A, which may be attached to the request for consultation.

Aircrew Eye Examination in Conjunction with Initial Aircrew PHA

5. A full aircrew eye examination, including cycloplegic refraction, is required within the 12 months preceding CFEME review of an Initial Aircrew PHA. Cycloplegic refraction is required for all initial aircrew to determine the native correction and compute the spherical equivalent. Colour Vision testing is only required in conjunction with an Initial Aircrew PHA, as per Table 3 of ref C.

Aircrew Eye Examination following Initial Aircrew PHA

6. For **Group A Aircrew**, periodic eye examination will be done:

a. Every 4 years after the initial eye examination to age 40 (every 2 years if the member uses corrective lenses);

b. Every 2 years after age 40; and

c. At an increased frequency based on clinical condition (e.g. glaucoma suspect, diabetes, etc.)

7. For **Group B Aircrew**, periodic eye examination will be done with each PHA, the frequency of which is in accordance with ref H. As per Table 4 of ref C, colour vision testing is not required as a component of subsequent Type I and Type II Aircrew PHAs; however, should any clinical concern regarding acquired colour deficiency arise, CFEME should be contacted for guidance. Ishihara Plates and Farnsworth D15 are not sensitive for typical acquired colour vision deficiency and alternate testing methods, such as the computer based CCTHD Color DX, are likely required.

8. Where visual status changes sufficiently to warrant a V factor change below aircrew MOSID standards, the aircrew member must be referred to an optometrist for confirmation, and to an ophthalmologist if clinically indicated. All V factor changes below MOSID standards must be forwarded to 1 CAD Surg/ASCS, with a recommendation for employment based on member's reported visual function, for consideration of medical employment limitations. 1 CAD Surg/ASCS may request consultation advice from CFEME

and/or the Aerospace and Undersea Medical Board, before making a final recommendation, and will then forward its recommendation to D Med Pol for approval (except in the case of change to A factor only, which may be approved by ASCS and/or AUMB).

VISUAL ACUITY STANDARDS

9. In conjunction with Initial Aircrew PHA: Aircrew applicants must meet visual acuity standards as defined in Table 1 below. Near vision is determined using “Times New Roman” type and is assessed both at reading distance 30-50 cm and at 100 cm. Further explanation of near vision assessment is found at Appendix 1 of Annex A of ref A.

10. Aircrew must meet criteria for near and distance vision. The final visual category assigned will consider **both** distance vision and near vision; the worse of the two (distance or near) will take precedence when assigning the final visual category.

Table 1: Visual Acuity Standards for Aircrew

	V1		**V2** PILOTS and SAR		**V3** OTHER AIRCREW except FLIGHT SURGEON		**V4** FLIGHT SURGEON	
	Better Eye	**Other Eye**	**Better Eye**	**Other Eye**	**Better Eye**	**Other Eye**	**Better Eye**	**Other Eye**
Uncorrected Distance Vision	6/6	6/9	6/18 or 6/12	6/18 or 6/30	6/60	6/60	N/A	
Corrected Distance Vision	N/A		Corrected 6/6	6/9	Corrected 6/6	6/9	Corrected 6/9	6/60
Uncorrected Near Vision at <u>30-50cm</u>	N5	N6	N10 or N8	N10 or N12	N/A		N/A	
Corrected Near Vision at <u>30-50cm</u>	N/A		N5	N6	N5	N6	N6	N36
Uncorrected Near Vision at <u>100cm</u>	N14	N18	N24 or N16	N24 or N36	N/A		N/A	
Corrected Near Vision at <u>100cm</u>	N/A		N14	N18	N14	N18	N18	N36

* Table 1 Notes:

a. Spherical equivalent (SE) is determined by algebraically adding half the cylinder part of the correction to the spherical part of the correction, (cylinder/2 + sphere).

b. Aircrew applicants with a pre-op refractive error greater than -6.00 diopters SE require a dilated retinal examination by an optometrist or ophthalmologist to assess for any retinal pathology including lattice. Any retinal pathology requires assessment by an ophthalmologist. Retinal lattice is disqualifying for aircrew, other retinal pathology is discussed on a case-by-case basis.

c. For Group A aircrew applicants, a spherical equivalent greater than -8.00 SE diopters or +3.00 SE diopters including prior to laser refractive surgery is disqualifying.

d. For Group B aircrew applicants, a myopic refractive error greater than -6.00 SE diopters if associated with retinal pathology including lattice; however, in the absence of retinal pathology, the pre-op refractive error may exceed -8.00 SE diopters if subsequently corrected by acceptable refractive surgery. A hyperopic refractive error greater than +5.00 SE diopters is disqualifying. Please contact CFEME with any questions on refractive limits.

e. V5 is not included in Table 1 as it is not typically compatible with any aircrew duties.

f. Near visual equivalents of the N type can be found in Appendix 2 of Annex A of this guideline.

ACQUIRED COLOUR VISION DEFICIENCY

11. Acquired colour defects can occur due to ocular pathology such as central serous retinopathy or cataract. Ishihara Plates and Farnsworth D15 are not sensitive for acquired colour vision deficiency and additional testing methods may be required. Should any clinical concern arise, CFEME should be contacted for guidance on the vocational assessment of a possible acquired colour vision deficiency.

OCULAR MUSCLE BALANCE

12. Ocular muscle balance should be measured at 30-50 cm and at 6 m with the individual wearing the correction required for these distances and with measurement in prism diopters of any horizontal and vertical heterophoria using the alternate cover test or Maddox rod.

13. Diplopia in any field of gaze is disqualifying.

14. There must be less than 2 prism diopters of vertical deviation (hyperphoria or hypophoria) at both 30-50 cm and 6 m. Up to 10 diopters of horizontal deviation (exophoria or esophoria) at both 30-50cm and 6 m is acceptable providing there is no history of diplopia. Borderline cases can be assessed at CFEME.

15. AMTOs, Flight Surgeons and Aeromedical Evacuation (AE) personnel may be considered acceptable with higher ocular muscle imbalance provided there is stable fusion and there is no history or evidence of diplopia.

KERATOCONUS (KC)

16. Keratoconus is a progressive non-inflammatory thinning and distortion of the central cornea.

17. Applicants with a diagnosis of KC are suitable for service after they have undergone collagen cross-linking (CXL, no specific technique) and have demonstrated stability on two post-operative corneal tomography examinations and refractions, not less than 12 months apart.

a. No increase in Kmax (steepest corneal measurement) >1D, astigmatism >0.5 D or myopia >0.5 D SE

b. Meet visual standards with glasses

c. Unfit if post-operative Kmax >58D or corneal thickness <400 um

d. All aircrew candidates must have post-CXL contrast sensitivity testing and assessment at CFEME to ensure that post-operative standards are met.

e. Aircrew eye exams with corneal tomography is required at 2 years, 5 years and 10 years post CXL.

18. Untreated KC or corneas with changes suspicious of KC are not accepted.

19. Serving members diagnosed with KC or whom have corneal changes that are suspicious for KC require careful follow-up by a corneal specialist and consideration of CXL if KC is confirmed. Following successful treatment, they are reassessed for return to service on a case-by-case basis.

INTRAOCULAR PRESSURE (IOP) / GLAUCOMA

20. Intra-ocular pressures should be measured and recorded in each eye at every aircrew eye examination, both initial and periodic.

21. Glaucoma suspects, identified by any of the following, must be referred to an ophthalmologist for a full glaucoma assessment. This assessment should be reviewed prior to completion of the Aircrew PHA where feasible. Glaucoma suspects who are not diagnosed with glaucoma remain glaucoma suspects and require subsequent surveillance with repeat full glaucoma assessment at least every 2 years or as recommended by the eye care professional.

a. An IOP in either eye greater than 22 mmHg;

b. A difference of 4 mmHg or greater between eyes;

c. Pigmentary dispersion syndrome;

d. Narrow angles;

e. Suspicious optic nerve cupping; or

f. Visual field defects.

22. An adequate glaucoma assessment should include the following:

    a. Visual acuity;

    b. Intraocular pressures;

    c. Corneal pachymetry;

    d. Gonioscopy;

    e. Optical coherence tomography (OCT) of the optic nerve head is required Colour copies of the OCT images should be obtained and uploaded to CFHIS in colour. If available, fundus photos of the optic nerves may also be uploaded;

    f. Automated visual field testing (images should be scanned to CFHIS);

    g. Treatment recommendations, if indicated; and

    h. Follow-up recommendations.

23. Glaucoma, as defined by the following, requires treatment:

    a. Glaucomatous change in the optic nerve;

    b. Visual field loss characteristic of glaucoma, with or without IOPs greater than 21 mm Hg; or

    c. IOP greater than 28 mm Hg in either eye, even without the presence of optic nerve or visual field changes.

24. Aircrew with treated glaucoma whose intraocular pressures are controlled by laser treatment or topical medications, and who have no significant field loss may be fit for unrestricted flight duties. Aircrew with glaucoma should be assigned a MEL as follows: G3 – Requires medical follow-up less often than six monthly. This requires a CF2033/CF2088 with review through normal channels beginning with 1 CAD Surg/ASCS.

PERIPHERAL RETINAL DEGENERATIONS AND RETINAL BREAKS

25. There are several retinal conditions that are commonly noted with varying risks of retinal detachment and medical follow-up requirements. Appropriate ophthalmologic assessment and follow-up is important to ensure both that there is no undue risk to the individual from stressors of flight and that the condition does not present any safety concern. The routine use of refractive surgery has corrected myopia but resulted in an increased incidence myopia-related peripheral retinal pathology in RCAF aircrew.

Lattice Degeneration

26. Lattice degeneration looks like “stretch marks” in the peripheral retina and are areas of peripheral retinal thinning with increased vitreoretinal adhesion. Lattice is present in 8% of the general population but is more common with increasing myopia. Lattice is easy to miss and becomes more pigmented with age so over time “new” lattice degeneration can be diagnosed where it was previously unrecognised.

27. Lattice is a risk factor for retinal tears and detachments when sudden shifts or age-related liquefaction in the vitreous creates traction on the thinned retina. Myopic eyes with their elongated thin retinae and increased prevalence of lattice are at the highest risk. The combination of myopia over -6 D and lattice pushes the annual risk of retinal detachments over 0.5% and the annual risk of a retinal tear to over 2%. A sudden retinal tear or detachment can be a Class 3 medical event making lattice an unacceptable risk in aircrew applicants who have a refraction of over -6 D.

28. Lattice is less common in hyperopic and low myopic eyes; however, occasionally retinal tears and detachments will occur. The USAF Lattice Degeneration Study looked at aircrew with lattice. At 5 years, there was an annual rate of retinal tears of 0.48% and a retinal detachment rate of 0.08%.

29. There is not enough data to determine if high G platforms increase the risk of retinal tears or detachments however, it is reasonable to assume that high G could cause more vitreoretinal traction. Most retinal surgeons consider that aircrew flying high G platforms are at increased risk of retinal breaks and will consider laser treatment of predisposing retinal conditions to be beneficial.

30. Management of lattice degeneration in aircrew:

a. Lattice degeneration of any degree and myopia greater than -6 D SE is unfit for aircrew duties; and

b. Lattice degeneration and myopia less than -6D: must undergo an assessment with an ophthalmologist or retinal specialist. If they are asymptomatic, they can remain on flight and controlling status pending the evaluation.

(1) If asymptomatic and low risk for retinal detachment:

(a) Fit for unrestricted aircrew duties;

(b) Dilated eye examination q 2 years; and

(c) If any new floaters, flashes, or peripheral scotoma occur, they should present promptly for evaluation and are grounded until a dilated eye examination is carried out.

(2) Symptomatic or high risk for retinal detachment: High risk characteristics include retina traction, retinal breaks, or subretinal fluid. Aircrew are grounded pending evaluation with a retinal specialist.

(a) High risk lattice or retinal breaks can be treated by laser or cryotherapy to decrease the risk of retinal detachment.

(b) Aircrew are grounded following treatment until they have been assessed post-operatively by the surgeon and a report provided confirming that the treatment is adequate, and an updated visual acuity has been obtained confirming that they meet aircrew visual standards.

(c) Consultation with ASCS for trained aircrew or CFEME for untrained aircrew is required once the results of the local specialist consult is available.

(d) A 6-month post procedure dilated eye examination is required.

(e) If returned to flight after treatment, a dilated retinal exam of both eyes will be required annually.

Atrophic Retinal Holes

31. Atrophic retinal holes are age-related and found in about 5% of the population with an increased prevalence in myopes. If not associated with lattice or vitreoretinal traction, atrophic retinal holes are very low risk.

32. Management of retinal holes in aircrew:

a. Asymptomatic aircrew with no additional risk factors (lattice, vitreoretinal traction) require an assessment by an ophthalmologist or retinal specialist. They do not require grounding while the assessment is pending, and if no new concerns are identified may continue flight duties with the frequency of dilated eye examinations as directed by the specialist.

b. Symptomatic aircrew OR those with high risk factors (lattice, vitreoretinal traction):

(1) Aircrew are grounded pending evaluation with a retinal specialist;

(2) Consultation with ASCS for trained aircrew or CFEME for untrained aircrew is required once the results of the local specialist consult is available;

(3) High risk retinal holes can be treated by laser or cryotherapy to decrease the risk of retinal detachment; and

(4) If returned to flight after treatment, a dilated retinal exam of both eyes will be required annually, and then as directed by ophthalmology.

Retinoschisis

33. Retinoschisis is present in about 4% of the population over the age of 40. It is a cystic splitting of the peripheral retina and full thickness retinal breaks are rare. The life-time risk of progression to a retinal detachment is 0.05%. A retinal assessment and ongoing follow-up dilated eye exams q 2 years is generally the treatment of choice. If asymptomatic, no grounding is required pending the initial specialist assessment.

Ocular Trauma and Symptomatic Age-Related Posterior Vitreous Detachments

34. Ocular trauma and symptomatic age-related posterior vitreous detachments are other causes of retinal tears and detachments. If one eye has had a (non-traumatic) retinal tear or detachment, then the risk of a retinal tear or detachment is elevated in the fellow eye over the next 5 years. If a member has required laser for a retinal tear or had a retinal detachment, they require very careful monitoring of **both** eyes with a dilated retinal exam at least every year.

35. A retinal detachment in aircrew requires consultation with ASCS for trained aircrew or CFEME for untrained aircrew. Post-operative fitness to fly is assessed on a case-by-case basis. In the USAF, over 90% of aircrew are returned to aviation duty post-retinal detachment repair.

FLYING RESTRICTIONS/TRAINED AIRCREW

36. Pilots changing from V1 to V2 must have their visual category changed and the MEL, "**A1 – Must wear corrective lenses while flying**", added locally. If change is equivocal, Aircrew Eye Exam completed by optometrist or ophthalmologist will take precedence over a concurrent Part 1 visual acuity. Review by 1 CAD Surg/ASCS or D Med Pol is not required if the absence of functional impairment is confirmed by the examining clinician.

37. Pilots and Search and Rescue Technicians who become V3 (below standards) will have the appropriate documentation forwarded through 1 CAD Surg/ASCS for recommendations to D Med Pol. The following MEL may be recommended locally, for ASCS review: "**A1 – Must wear corrective lenses while flying**". Former CAF Pilots who, in the past, were routinely made V3/A3 may be re-enrolled as V3/A1 after appropriate ophthalmic assessment and waiver process (guidance on this process may be provided by CFEME).

38. All aircrew changing to V4 will be assessed and assigned MELs on a case-by- case basis. Appropriate documentation should be forwarded to 1 CAD Surg/ASCS for recommendations and documentation of any apparent functional impairment (with consultation to AUMB and CFEME as appropriate), which will then be forwarded to D Med Pol.

ALTERATION OF CORNEAL REFRACTIVE STATUS

LASER Refractive Surgery

39. Refractive error limits for aircrew and details on acceptable procedures for correction of refractive error may be found at refs C and F.

40. CAF members considering LASER refractive surgery must familiarize themselves with Ref F and review with a Flight Surgeon prior to proceeding with this procedure. It is also important to note that members must get the approval of their CO before undergoing the procedure and that laser eye surgery is not funded by the CAF.

Intra-Corneal Rings and Radial Keratectomy (RK)

41. Inter-corneal rings and radial keratectomy are disqualifying for all aircrew.

Orthokeratology (Corneal Refractive Therapy)

42. Orthokeratology treatments are unacceptable and will be disqualifying until the practice has been stopped for a period of six-months.

Keratoplasty (Corneal Transplant)

43. A history of lamellar or penetrating keratoplasty is disqualifying.

CONTACT LENSES

44. The determination of the A factor of those pilots choosing to fly with contact lenses is the same as for a pilot wearing spectacles (i.e. according to their unaided vision). Funding for contact lenses may be provided for aircrew in certain roles IAW ref D but is not normally otherwise provided. When aircrew wear contact lenses, they must be properly fitted and certified that they were appropriately fitted without problems. Daily wear contact lenses are recommended as extended wear contact lenses have a 10X risk of corneal infections.

POLARIZED LENSES

45. Polarized lenses are not allowed for any aircrew duties.

TRANSITION LENSES

46. Transition sunglasses are not allowed for any aircrew duties.

MULTIFOCAL AND PROGRESSIVE LENSES

47. Bifocals, trifocals, and progressive lenses are acceptable for all aircrew trades.

48. If a clinician learns of a desire to seek such lenses, they should review this policy with the member. When seeking any such lenses, the aircrew member should advise the optometrist of important operational visual distances such as distance to instruments, screens, or other data; this will ensure that the correct add is used and that distortion is minimized. A minimum 7-day period of grounding is required with a first pair of multifocal or progressive lenses (including a change from multifocal to progressive lenses) to allow for adaptation to focal distances and illusory movement. Prior to return to flying, a functional assessment IAW Annex C is required to ensure adaptation, appropriate fit with other gear, and effective vision correction in the flight environment. This functional assessment shall include a ground check in the aircraft, and if successful, an in-flight assessment thereafter. An in-flight assessment in a simulator is acceptable, if available. Aircrew should fly at least once in a non-safety-critical role in their specific platform to evaluate the new multifocal or progressive lenses in a representative dynamic flight environment, operating a range of flight conditions (including VFR and IFR approaches for pilots) and using all visual display systems. Assessment of distance vision, especially when landing, is important. A Standards pilot and/or Flight Surgeon may be engaged to participate in further evaluation, should any difficulties be identified. If functional assessment suggests possible problems with the lenses themselves, then the optometrist should be consulted to consider a change in design of lenses.

INTRAOCULAR LENS IMPLANTS (IOL)

49. Certain types of intraocular lens (IOL) implants are acceptable for unrestricted flying duties following cataract surgery provided there are no complications, and all visual standards are met. Grounding is required during the post-op recovery period and until at least 7-days after post-operative glasses are prescribed and in use.

a. For Group A aircrew, only monovision IOLs (including toric IOLs for astigmatism) are permitted. No multifocal, extended depth of focus, or accommodative IOLs are allowed;

b. For Group B aircrew, monovision IOLs (including toric IOLs for astigmatism) are permitted and some multifocal IOL designs may be considered with careful assessment of the risks vs benefits and with approval of CFEME. Prior to return to flying, a functional assessment based on occupational tasks in the aircraft to ensure adaptation and effective vision correction in the flight environment;

c. Silicone IOLs are not allowed for aircrew; and

d. All IOLs incorporate UV protection but blue blockers are not allowed for aircrew.

50. New IOL options may become available and consultation with CFEME is strongly recommended for all aircrew prior to cataract surgery.

SUMMARY

51. Beyond the obvious importance of visual function in air operations, such function represents the single-most frequent cause for aircrew candidate unsuitability. It follows that Flight Surgeons must have a thorough knowledge of aircrew visual requirements and should ensure that visual examinations are carried out completely, accurately and at the required intervals.

52. Where doubt exists as to the implications of visual function to the suitability of an aircrew candidate or in experienced aircrew, such cases should be discussed with or referred to CFEME or the 1 CAD Surg/ASCS, respectively.

ANNEX A - REQUIREMENTS FOR AIRCREW EYE EXAMINATIONS

1. Canadian Forces aircrew are required to have full eye examinations as part of an initial aircrew PHA and then periodically as per Para 7 above. Near and distance visual acuity testing is included with each annual aircrew medical examination. Aircrew eye examinations may be done by an ophthalmologist or an optometrist following elements are required for Canadian Forces aircrew eye examinations. Incomplete examinations will be returned to the examining health care specialist for completion:

a. A thorough clinical ophthalmological assessment;

b. Near and distant visual acuity, corrected and uncorrected;

c. Refraction:

(1) In conjunction with an Initial Aircrew PHA for all aircrew MOSIDs or occupational specialties (including a change from one aircrew MOSID to another), a cycloplegic refraction is required on aircrew eye examination; and

(2) For subsequent examinations after an Initial Aircrew PHA (excepting a change from one aircrew MOSID to another), a manifest refraction may be done in lieu of cycloplegic refraction;

d. Ocular muscle balance, measured at 30-50 cm and 6 m with the individual wearing the correction required for these distances and with measurement in prism diopters of any horizontal and vertical heterophoria using the alternate cover test or Maddox rod;

e. Slit lamp exam;

f. Intraocular pressures with referral to an ophthalmologist for full glaucoma if identified as a glaucoma suspect;

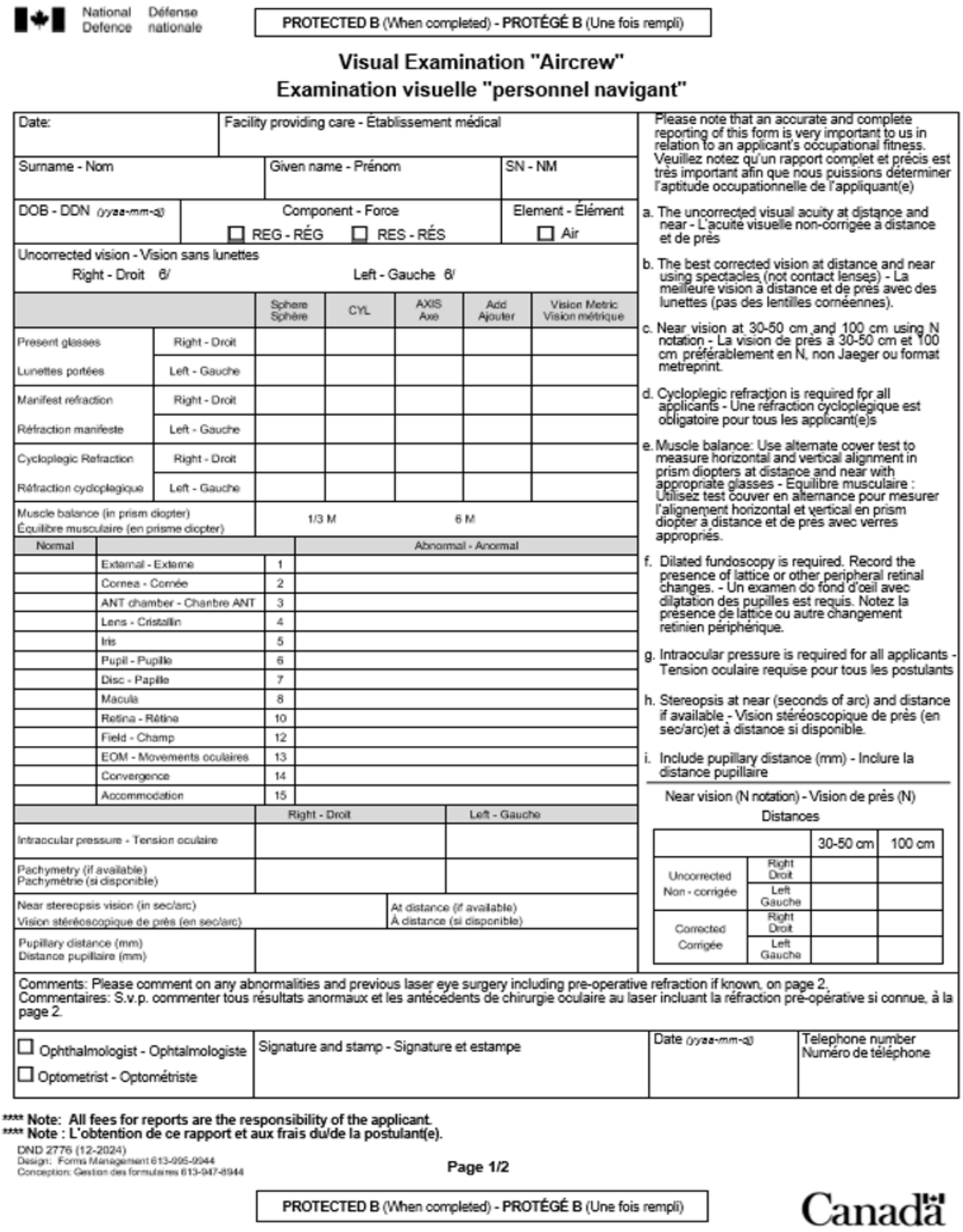
g. Dilated fundus exam with documentation of lattice or other retinal changes;

h. Visual fields by confrontation, with automated visual field testing if clinically indicated; and

i. Near stereopsis measured in sec/arc.

Appendix 1 of Annex A – DND 2776 Visual Acuity for Aircrew Form

1. This form is available in the Defence Forms Catalogue.



National Defence / Défense nationale

PROTECTED B (When completed) - PROTÉGÉ B (Une fois rempli)

Visual Examination "Aircrew"
Examination visuelle "personnel navigant"

Date:	Facility providing care - Établissement médical	
Surname - Nom	Given name - Prénom	SN - NM
DOB - DDN (yyaa-mm-dj)	Component - Force ☐ REG - RÉG ☐ RES - RÉS	Element - Élément ☐ Air

Uncorrected vision - Vision sans lunettes
Right - Droit 6/ Left - Gauche 6/

		Sphere Sphère	CYL	AXIS Axe	Add Ajouter	Vision Metric Vision métrique
Present glasses	Right - Droit					
Lunettes portées	Left - Gauche					
Manifest refraction	Right - Droit					
Réfraction manifeste	Left - Gauche					
Cycloplegic Refraction	Right - Droit					
Réfraction cycloplegique	Left - Gauche					

Muscle balance (in prism diopter) / Équilibre musculaire (en prisme dioptre): 1/3 M 6 M

Normal			Abnormal - Anormal
	External - Externe	1	
	Cornea - Cornée	2	
	ANT chamber - Chambre ANT	3	
	Lens - Cristallin	4	
	Iris	5	
	Pupil - Pupille	6	
	Disc - Papille	7	
	Macula	8	
	Retina - Rétine	10	
	Field - Champ	12	
	EOM - Mouvements oculaires	13	
	Convergence	14	
	Accommodation	15	

	Right - Droit	Left - Gauche
Intraocular pressure - Tension oculaire		
Pachymetry (if available) / Pachymétrie (si disponible)		

Near stereopsis vision (in sec/arc) / Vision stéréoscopique de près (en sec/arc)
At distance (if available) / À distance (si disponible)

Pupillary distance (mm) / Distance pupillaire (mm)

Please note that an accurate and complete reporting of this form is very important to us in relation to an applicant's occupational fitness. Veuillez notez qu'un rapport complet et précis est très important afin que nous puissions déterminer l'aptitude occupationnelle de l'appliquant(e)

a. The uncorrected visual acuity at distance and near - L'acuité visuelle non-corrigée à distance et de près

b. The best corrected vision at distance and near using spectacles (not contact lenses) - La meilleure vision à distance et de près avec des lunettes (pas des lentilles cornéennes).

c. Near vision at 30-50 cm and 100 cm using N notation - La vision de près à 30-50 cm et 100 cm préférablement en N, non Jaeger ou format metreprint.

d. Cycloplegic refraction is required for all applicants - Une réfraction cycloplégique est obligatoire pour tous les applicant(e)s

e. Muscle balance: Use alternate cover test to measure horizontal and vertical alignment in prism diopters at distance and near with appropriate glasses - Équilibre musculaire : Utilisez test couver en alternance pour mesurer l'alignement horizontal et vertical en prism diopter à distance et de près avec verres appropriés.

f. Dilated fundoscopy is required. Record the presence of lattice or other peripheral retinal changes. - Un examen do fond d'oeil avec dilatation des pupilles est requis. Notez la présence de lattice ou autre changement retinien périphérique.

g. Intraocular pressure is required for all applicants - Tension oculaire requise pour tous les postulants

h. Stereopsis at near (seconds of arc) and distance if available - Vision stéréoscopique de près (en sec/arc)et à distance si disponible.

i. Include pupillary distance (mm) - Inclure la distance pupillaire

Near vision (N notation) - Vision de près (N)
Distances

		30-50 cm	100 cm
Uncorrected Non - corrigée	Right Droit		
	Left Gauche		
Corrected Corrigée	Right Droit		
	Left Gauche		

Comments: Please comment on any abnormalities and previous laser eye surgery including pre-operative refraction if known, on page 2.
Commentaires: S.v.p. commenter tous résultats anormaux et les antécédents de chirurgie oculaire au laser incluant la réfraction pré-opérative si connue, à la page 2.

☐ Ophthalmologist - Ophtalmologiste ☐ Optometrist - Optométriste	Signature and stamp - Signature et estampe	Date (yyaa-mm-dj)	Telephone number Numéro de téléphone

****** Note: All fees for reports are the responsibility of the applicant.**
****** Note : L'obtention de ce rapport et aux frais du/de la postulant(e).**

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Design: Forms Management 613-995-9944
Conception: Gestion des formulaires 613-947-8944

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PROTECTED B (When completed) - PROTÉGÉ B (Une fois rempli)

Canada

SN - NM	Surname – Nom	Given name – Prénom	DOB - DDN (yyaa-mm-dj)

Comments: Please comment on any abnormalities and previous laser eye surgery including pre-operative refraction if known.

Commentaires: S.v.p. commenter tous résultats anormaux et les antécédents de chirurgie oculaire au laser incluant la réfraction pré-opérative si connue, à la page 2.

☐ Ophthalmologist - Ophtalmologiste ☐ Optometrist - Optométriste	Signature and stamp - Signature et estampe	Date (yyaa-mm-dj)	Telephone number Numéro de téléphone

Appendix 2 of Annex A – Visual Acuity Conversion Charts

Reference: UK Civil Aviation Authority Vision Conversion Chart
https://www.caa.co.uk/media/jblh5jzp/20230817-vision-conversion-chart-v2-0.pdf

Distance visual acuity conversion chart

UK	Decimal	LogMAR	5m	US
6/3	2.00	-0.30	5/3	20/10
6/4	1.50	-0.18		20/13
6/5	1.20	-0.08		20/17
6/6	1.00	0.00	5/5	20/20
6/9	0.67	0.18	5/7.5	20/30
6/12	0.50	0.30	5/10	20/40
6/18	0.33	0.48	5/15	20/60
6/24	0.25	0.60	5/20	20/80
6/36	0.20	0.78	5/30	20/120
6/60	0.10	1.00	5/50	20/200

Near visual acuity conversion chart

UK (at 40cm)	US (at 40cm)	Jaeger (at 40cm)	Decimal	Distance equivalent
N4.5	20/20	J1	1.00	6/6
N5	20/30	J3	0.67	6/9
N6	20/40	J5	0.50	6/12
N8		J6	0.40	
N10	20/60	J7	0.33	6/18
N12	20/80	J9	0.25	6/24
N14	20/100	J10	0.20	6/30
N18		J13	0.13	
N24	20/200	J14	0.10	6/60
N36				
N48				

Intermediate visual acuity conversion chart

UK (at 100cm)	US (at 100cm)	Jaeger (at 100cm)	Decimal	Distance equivalent
N8	20/20	J6	1.00	6/6
N10	20/25	J7	0.80	6/7.5
N12	20/30	J9	0.67	6/9
N14	20/40	J10	0.50	6/12
N18	20/60	J13	0.33	6/18
N24	20/80	J14	0.25	6/24
N36				
N48	20/200		0.10	6/60

Note: the near vision conversions are approximated to the nearest N Point or Jaeger equivalent.

ANNEX B – MULTIFOCAL AND PROGRESSIVE GLASSES: GROUND CHECK AND IN-FLIGHT CHECK

Introduction

1. The following are simple operational tools used to confirm that individuals with new multifocal or progressive lenses can see well without distortion wearing their glasses in their normal operational flying environment. Ground and in-flight checks should occur after the requisite period of 7-days has elapsed to allow the members to adapt to focal distances and illusory movement, and tolerance of the lenses is confirmed.

2. There is no failure cut-off but any errors would raise concern about flight safety. Both the Test Form and the Response Form should be submitted to a BAvMed Provider or Flight Surgeon and retained on the permanent medical file.

Ground Check – Mandatory Self-Assessment

3. Prior to proceeding with an in-flight check, aircrew shall undertake a comprehensive ground check in the aircraft. Any shortcomings or inadequacies identified in the design or function of the glasses during the ground check should be discussed with the optometrist, rectified, and re-evaluated if necessary. The ground check self-assessment questions are found at Appendix 1.

In-flight Check – Mandatory Self-Assessment and Optional Examiner Check

4. Subject to a successful ground check, aircrew shall complete an in-flight self-assessment, using questions from Appendix 2. Aircrew should fly at least once in a non-safety-critical role in their specific platform to evaluate the new glasses in a representative dynamic flight environment, operating in a range of flight conditions (including VFR and IFR approaches for pilots) and using all visual display systems. Aircrew should continue to monitor functionality during the first few sorties.

Appendix 1 of Annex B - Ground Check: Mandatory Self- Assessment Questions

Member Name:	SN:	
Date of assessment:		
Question	**Y**	**N**
1. Can glasses be worn comfortably with the:		
a. helmet?		
b. mask?		
c. headset?		
d. other head-worn safety equipment?		
2. Are these areas free of hot (tender) spots:		
a. ears?		
b. nose?		
c. temples?		
3. Do the glasses sit in the appropriate location on the face when a mask is worn?		
4. Is glasses use free of interference with the use of aviation life-support equipment?		
5. Do glasses provide adequate correction across the range of viewing distances in the cockpit environment or aircrew workstation including the[1]:		
a. primary instrument panel?		
b. control column?		
c. over-head panel?		
d. middle instrument panel?		
e. far panel?		
f. centre console?		
g. knee board?		
h. other displays?		
6. Is the height of the reading segment appropriate for the aviation environment with the head in operationally representative postures and scanning patterns?		
7. Are you able to adopt operationally representative postures and scanning patterns without restriction of near or intermediate vision by the blurred peripheral section?		

1. Based on a generic pilot in a multi-crew cockpit in a transport aircraft. Other aircrew should use their discretion and judgment to confirm adequate correction at relevant key areas within the workspace that must be viewed clearly, and for which vision correction is required.

Appendix 2 of Annex B – In-flight Check: Mandatory Self-Assessment Questions

Member Name:	SN:	
Date of assessment:		
Question	**Y**	**N**
1. Are the glasses comfortable when worn for prolonged periods?		
2. Is prolonged use possible without development of hot (tender) spots?		
3. Are the glasses stable in flight?		
4. Are the glasses stable under positive Gz forces that are expected for the platform?		
5. Are the glasses stable when moving the head in flight (e.g. check-6)?		
6. Are you able to adopt operationally representative postures and scanning patterns without restriction of near or intermediate vision by the blurred peripheral section??		
7. Do the glasses adequately and quickly correct vision requirements in the cockpit or aircrew workstation?		
8. Is outside vision unobstructed beyond the frame of the glasses?		
9. Is vision well-maintained in visually demanding circumstances e.g. night flying, reduced visibility, close formation, air-to-ground, hover, load-swinging activities (depending on nature of platform being flown) or during use of visual display systems (HUD, HMDs, JHMCS, NVGs)? (Circle required re-checks if “N”)		
10. Is it possible to quickly adapt in dynamic visual situations (e.g. alternating checks of distant target with control panel)		