

BRITISH GLIDING ASSOCIATION

Guidance notes on the medical fitness
required for Glider Pilots

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1. BGA POLICY

In the United Kingdom, the control of all aspects of gliding has been delegated to the British Gliding Association since 1931. In 1967, following a serious accident, a medical declaration was introduced and this has resulted in a level of safety comparable with other areas of aviation. When the National PPL was proposed, a similar medical declaration was adopted. The BGA Executive Council has decided to align the BGA medical documentation with the NPPL and the other air sports with effect from March 1st 2003. These Guidance Notes supplement the BGA 'Laws and Rules' [1]. All members of BGA clubs will be included so long as their flying is primarily associated with gliding operations. The BGA remains responsible to the Civil Aviation Authority for the exercise of these delegated powers. The BGA medical adviser is a member of the Civil Aviation Authority Medical Forum where common aeromedical interests are represented.

2. DISEASE AND AVIATION

While disease is responsible for relatively few accidents, it remains a potential cause. Either disease, old age, or an accident will end every flying career. Medical examinations were originally introduced by the military to predict success in training, with an emphasis on functional tests of the special senses. The expensive training investment required an assurance that the subsequent career would be long and productive. The risk of incapacity had to be minimised. For private pilots paying their own expenses such rigorous selection criteria are unjustified. The problem of risk management consequent upon incapacity remains and has to be addressed in statistical terms. As with road transport, a balance has to be struck between limiting the freedom of individuals and exposing third parties to risk. Operational limitations may be imposed to reduce risk to the pilot or others. Incapacity is mostly caused by neurological disease in the younger pilots and cardio-vascular disease in the older age groups. The frequency of declarations reflects this prevalence. Last, but most difficult to manage are diseases of the mind which affect behaviour. The ability of a screening medical examination to exclude future disease is limited, so the BGA policy involves the pilot and their general practitioner, with support from the aviation medicine adviser and participation by non-medical club officials.

3. MINIMUM MEDICAL STANDARDS

The normal medical standard of fitness is the same as that required by the Driving and Vehicle Licence Authority [DVLA] for professional [Group 2] drivers. Pilots who fall below this standard, but meet the private [Group 1] Standard may fly, but cannot be responsible for other persons in the air. These are known as restricted pilots. Guidance for Medical Practitioners is

published by the DVLA [2]. For a few conditions, mostly unchanging disabilities which are not a hazard in aviation, waivers will be granted following demonstrated competence. Glider pilots who earn their living as professional instructors must hold a JAA Class 2 or higher medical certificate [1].

4. RESPONSIBILITIES OF PILOTS

Fitness to fly is the personal and legal responsibility of the pilot. This is to include unfitness from short term illness, fatigue, and abuse of alcohol or other drugs. For health maintenance, it is necessary for pilots to be registered with a general practitioner. To demonstrate fitness the pilot undertakes to seek medical advice when needed and obtain a periodic endorsement of the medical declaration. If a medical limitation has been imposed, it is the duty of the pilot to bring this to the notice of club officials. Pilots also need a knowledge of human factors in aviation. These include physics of the atmosphere, some physiology, flying and health, and basic psychology. Published books intended for pilots are part of the training syllabus [3 or 4].

5. ENDORSEMENT BY GENERAL PRACTITIONERS

The general practitioner will be asked to endorse the medical declaration made by the pilot before the first solo flight and at intervals thereafter. The purpose of this is confirm from the clinical record the honesty of the declaration thereby preventing the concealment of serious disease, especially epilepsy. Where disease exists, the implications need to be fully understood by the pilot and an assessment of fitness made in accordance with the paragraphs on specific medical conditions and the management of established disease. It is recommended that a note is made of the fact that this patient is a pilot, and that a reassessment of fitness is suggested after any serious illness. A fee may be charged but no medical examination is required. For infrequently seen patients, GPs may choose to carry out opportunistic screening under the terms of the NHS contract. In case of doubt, aeromedical advice can be obtained from the BGA Medical Adviser.

6. ADVICE FROM THE BGA MEDICAL ADVISER

The medical adviser to the BGA can assist general practitioners with advice concerning borderline cases or other difficulties. Where the DVLA guidelines suggest that a condition should be referred for decision, this would be a matter for the BGA medical adviser. Confidential advice may also be sought by gliding club officials who are concerned about a pilot member. Contact should be made through the BGA office and can be by telephone letter or E-mail, but in the case of pilots seeking advice about their own condition, this must be in writing.

7. DUTIES OF GLIDING CLUB OFFICIALS

Gliding club officials have a duty to maintain documentation and submit statistical returns. They may become concerned with the

behaviour of a club member and consider that this might arise from disease, or else they may hear rumours of undisclosed medical problems. In cases where illness is suspected, but the pilot continues to fly, clubs may insist that a member takes medical advice. Poor airmanship by very experienced pilots can be an early sign of senile mental deterioration. Unless the club has a medical member who can offer internal advice, the action must be to seek advice from the BGA medical adviser. No pilot should be challenged on a medical matter, except by a medical practitioner. In some cases, usually mild depressive illness, authorisation to fly will be conditional on operating from one club where supervising officials have been told in confidence of the nature of the disease. Reports on progress will dictate further management.

8. MEDICAL RISK MANAGEMENT

Aviation medical standards evolved for three reasons, to predict success in training, to ensure a long and productive career following expensive training, and to reduce accidents from incapacity in the air. However no medical examination, however extensive, can entirely exclude the possibility of incapacity so the problem is one of risk management.

8.1. For dual flying there are almost no restrictions on who can be taken into the air. Gliders provide shoulder restraint which would prevent an incapacitated person from obstructing the controls. Some gliding clubs make a practice of flying very disabled and handicapped people as a charitable endeavour, but note the later paragraph on the flying of mentally disabled individuals as passengers. The obese may exceed permitted cockpit weights, and small children are best carried in the rear seats of tandem gliders. It is recommended that Clubs offering initial 'Trial Lessons' should include the following phrase in their application form for temporary membership. "I will bring to the attention of my Instructor any medical condition which could cause an adverse effect during flight". This measure allows conditions which may range from airsickness to epilepsy to be considered.

8.2. Whilst undertaking training, it is a responsibility of the instructor to ensure that the student can operate all controls throughout the flight envelope and learns to fly the aircraft with safety. Disabled pilots are subject to flight tests and assessment in accordance with the later paragraph. Measurements of the special senses, vision or hearing, are predictors of training success. A deficiency can result in a failure to achieve competency, but because the costs fall upon the individual, it is not a reason for prior exclusion so long as they meet the DVLA requirements. Trainee pilots needing visual correction should be advised to wear sports type wide field spectacles. Before flying solo, a medical declaration endorsed by the general practitioner is required.

8.3. For solo flying, the pilot will have demonstrated competence and should not present a higher risk from incapacity to third parties than would occur driving a car on the public highway. As a minimum, to fly gliders solo, the pilot must meet the standards laid down by the DVLA to hold a private [Group 1] driving licence. Where a medical condition does induce a risk over and above that of a normal individual, it is important that the pilot fully understands both the nature of the risk, and his responsibilities to follow any recommended flight limitations, or other measures to reduce risk.

8.5. When taking responsibility for others in the air, the risks are comparable with that of being a pilot in any other aircraft. Glider pilots who suffer a medical condition which would debar them from holding a DVLA [Group 2] professional driving licence [2] are not permitted to become instructors or carry passengers unless a waiver has been granted. The clinical assessment of risk should not exceed a 2% chance of incapacity within the following year. This can be compared with the 1% risk level laid down for airline pilots [5]. Experienced instructors who become less fit or who are above the age of 70, but retain the DVLA Group 1 standard, may obtain a restricted authorisation from their Senior Regional Examiner to undertake ground supervision and fly with advanced pupils. These should be expected to land the aircraft following incapacity.

8.6. For mutual flying when two pilots fly together in an aircraft with dual controls, one must meet the DVLA Group 1 standard.

9. OPERATING LIMITATIONS

Operating limitations exist to reduce the risk in individual cases. They need to be compatible with gliding operations.

9.1. Pilots learn to fly in dual controlled two seat gliders, and after a few initial solo flights, convert to single seat aircraft. With considerable further experience they may be authorised to carry passengers or become instructors responsible for inexperienced pupils. The average individual will take several years to reach this level, and only 15% of glider pilots fly as instructors or carry passengers. These stages are known as:

Dual flying.

Solo flying.

Passenger carrying and Instructing.

[Basic, Assistant or Full Category Instructor]

9.2. In Club Operations all flying is the responsibility of the Chief Flying Instructor, and advancement between these stages require authorization by the CFI or an appointed deputy. They

also represent different levels of risk, and can be used as a basis of medical limitations which are easily understood by the gliding club. For some medical conditions where there is a risk of tissue hypoxia it might also be advisable to impose limitations for altitude or flight duration. These should be explained to, and agreed by the pilot. It would be usual to set altitude limits in steps of 5000ft. and draw attention to the BGA recommendations on the use of oxygen in flight. Another useful limitation is 'local flying'. This implies that the glider remains within gliding range and could land within about 15 minutes, if the pilot so desired. It is a normal limitation for inexperienced pilots. Flight limitation can also be expressed by time; 1 hour will allow local flying, 5 hours, limited cross country flying and few glider flights exceed 8 hours.

9.3. Medically restricted pilots, those who meet the DVLA Group 1, but not the Group 2 standard, should not be responsible for inexperienced persons in the air. Advanced instruction is permitted if the pupil pilot could reasonably be expected to make a successful landing following the incapacity of the first pilot. This permits solo and site checks. All gliding instructors over the age of 70 are medically restricted.

9.4. Pilots with defective colour perception need to be aware of their limitation. Coloured light signals are not used at gliding sites, but may be used at other airfields. Radio communication is essential in these circumstances.

9.5. Deaf pilots should not fly where radio communication is mandatory.

9.6. Pilots may be limited to flying at a named club where supervisors have been made aware of potential problems.

9.7. Other limitations may be imposed at the discretion of the BGA medical adviser.

10. DOCUMENTATION

The BGA will use the same medical declaration form as the National PPL with effect from 1st March 2003. A copy is at Annex 'A'. This is required to be renewed and endorsed on the following occasions which follow the DVLA requirement for professional drivers.

- Before the first solo flight.
- Issued after age 16 and valid to age 45.
- Every 5 years to age 65.
- Annually after age 65.
- After a serious illness.

11. TRANSITIONAL ARRANGEMENTS

Existing BGA declarations will be valid until they expire. Pilots

converting to Touring Motor Gliders or Tug aircraft will have to obtain a National PPL with the new Medical declaration. Although a NPPL permits passenger carrying when over the age of 70, this will not permit BGA instructional flying.

12. INTERNATIONAL REQUIREMENTS

The medical provisions for gliding and the NPPL contained in this note apply only to the United Kingdom and those countries which may have agreed mutual recognition. Most other countries require a Class 2 medical certificate for gliding which complies with the ICAO Annex. Power pilots holding a JAA Class 2 medical will be accepted in Europe, but may require local validation elsewhere.

13. GLIDER PILOTS HOLDING OTHER AVIATION MEDICAL CERTIFICATES

Pilots holding a valid JAA or ICAO medical certificate, Class 2 or above, are exempt from the requirement to sign a Declaration of Fitness. Aircrew serving in the Armed Services and showing evidence of holding a current aircrew medical category do not need to obtain endorsement of their declaration. Pilots holding medical certificates issued by any authority are responsible for their own fitness to fly and are subject to the same obligation to obtain medical advice as other pilots. Any operational restriction applied to an aviation licence also applies to gliding, unless a waiver has been agreed by the BGA medical adviser.

14. ADVICE ON SPECIFIC MEDICAL CONDITIONS

For further information a standard textbook of Aviation Medicine should be consulted [6]

14.1. Airsickness is very common, most pilots habituate to the motion, but in the training stage when still undergoing dual flying pharmacological assistance can be useful.

14.2. Visual defects comprise the largest group of conditions for which applicants are rejected from professional flying careers. Persons taking up gliding are best judged on flying performance. If they have difficulties, they will not progress. Modern contact lenses are compatible with gliding. Colour vision defects are unimportant because coloured signals are not used to control gliding operations. Monocular pilots, once adopted to their monocular state, can fly satisfactorily. Pilots who need spectacles should equip themselves with both clear and tinted spectacles of sports quality, which give a wide field of view. Yellow tints are useful at low level in hazy conditions, but for high altitude flight a dense grey or green filter is recommended. Photochromic lenses can cause difficulty when descending from sunshine into darker lower levels. Pilots who depend upon spectacles to achieve a safe landing should carry a readily accessible spare pair in case their normal pair falls out of reach.

14.3. Some deafness is universal in older aviators. The volume control on the radio offers amplification and the signal/noise ratio can be improved by excluding unwanted noise. A practical test by an instructor is needed where radio communication is essential.

14.4. Pregnancy: Women who are pregnant, or may be pregnant, should remain below 5,000 ft. The foetus is vulnerable to relative hypoxia, especially in the presence of other disease, such as anaemia. Morning sickness, reinforced by airsickness, can be difficult for some individuals, and those badly afflicted may find that they have to avoid flying in early pregnancy. Although of major concern to commercial flight crews, cosmic radiation is not a danger at the lower levels. There are usually no problems in the second trimester, but during the third trimester it is recommended that gliding be restricted to dual flying, with a careful check of full control movements before every flight. The return to flying after the birth should be staged at a rate which depends on any complications of the birth, the maternal ties of breast feeding, and the care available to the child on the ground.

14.5. Menstruation: Any problems related to the menstrual cycle or the menopause are best judged by the woman herself.

14.6 Blood donation: This will result in a loss of circulating volume and also oxygen carrying capacity of the blood. Glider pilots are advised not to fly that day and to be restricted to 5000 ft for five days.

14.7. Heart Disease: Coronary artery disease is a common cause of becoming unfit to fly and presents two problems. The recovery from the acute illness, and the risk of further infarction. Gliding can play a part in the recovery process, and the prospect of return can be used to encourage patients to give up smoking and control obesity. Club activities should start with ground attendance and no one should fly until they can undertake the physical work associated with gliding. When normal cardiac function is established, and risk factors eliminated, a slow return to dual and solo flying can be authorised. Because of the vulnerability of the cardiac muscle to hypoxia, the importance is emphasised of strict observance of the BGA recommended practice relating to the use of oxygen in flight. Because the underlying pathology is progressive, caution should be exercised in permitting return to unrestricted flying, most cases will remain restricted.

14.8. Hypertension: Some drugs used produce adverse side effects. Patients on hypotensive drugs should not fly until stabilised.

14.9. Diabetes: The outlook for diabetics in gliding, as in all other aspects of their lives, depends upon the quality of the

control exercised by the patient. Individuals dependent upon insulin, or taking drugs liable to cause hypoglycaemia, have to control their blood sugar levels as a power pilot manages the fuel supply. This system has to be monitored because to run out is potentially disastrous. Carriage of emergency carbohydrate is essential. Diabetic pilots are advised not to enter competitions or fly in circumstances where they would lose personal control over the flying task. Pilots injecting insulin are restricted and cannot be responsible for others in the air.

14.10. Psychiatric conditions: These can prove difficult to manage and provide the commonest reason why a gliding club may require a member to seek medical advice. Communication from the gliding club to the doctor can be helpful in making a diagnosis. Medical advice can help the gliding club to take proper action in supervising or limiting flying by the individual, with the avoidance of inappropriate disciplinary action. A history of neurotic illness is not a bar to gliding, and such individuals are often helped by the cooperative activity of a club. Suicide by aircraft is not unknown, but is rare. A previous suicide attempt need not be a bar to flying gliders. In psychiatric conditions, it is essential that the supervising instructors understand the nature of the illness, and for reasons of medical confidentiality this implies restriction to one club. Therefore it is recommended that membership is authorised at one named club where the officials have been informed in confidence of the nature of the illness; subsequent flying being at their discretion.

15. PRACTICAL MANAGEMENT OF ESTABLISHED DISEASE

For the purpose of fitness to fly, medical conditions can be divided into four categories; those which recover, remain static, or deteriorate, and a few for which the course is unpredictable. The management differs in each case.

15.1. Conditions which improve are commonest, because they include all minor intercurrent illnesses. Usually the pilot simply avoids flying for a short period and all is well. However dangers do exist for competition flying during which a lost day may lose all prospects of winning the contest. Competition officials, family and support crew should all be alert to the danger of flying when unfit. Following more serious illness, the return should be staged, days on the ground attending the club, dual flying, and then solo following a satisfactory check of flying skills. After serious illness or injury a new declaration of fitness is required before flying solo.

15.2. In unchanging conditions, quite serious neurological or orthopaedic disability may be compatible with flying gliders. It is in keeping with modern views that disabled people are encouraged to take up a sport, and gliding can be a useful opportunity. Disabled individuals should not be barred from a

sport because the risk to themselves is higher than it would be to other participants, but any increased risk must be fully understood by the individual. For unchanging conditions the best judge of fitness to fly is a flying instructor. With physical limitations, specific approval will be required for each type conversion. It is potentially possible to modify the control systems of gliders to accommodate almost any disability. Very small and lightweight pilots will require additional ballast, approved cushions or even control system modifications. The requirement of the BGA is that any such equipment or modification meets normal aircraft engineering standards, and is approved by a BGA Technical Inspector.

15.3. Medical conditions which deteriorate are more difficult to manage. This includes normal old age. Usually the gliding club will become aware of deteriorating skills before they would be apparent on a medical examination. Sooner or later all become restricted and pilots have to accept the loss of an instructor category. Later the right to fly solo and drive may be lost. Club officials may have the painful duty of grounding a member who in his day was a much respected mentor. Medical practitioners should beware of patients who attempt to engage support in an appeal against club decisions.

15.4. It is recommended that when general practitioners become aware that a patient flies gliders, this fact is noted in the clinical notes. If at a subsequent date the patient suffers from an illness, or is given treatment which might affect flight, the patient can be reminded of their responsibility. In extreme circumstances, when the pilot declines to follow medical advice and third parties are at risk, the medical practitioner may inform the BGA Medical Adviser.

15.5. Sometimes pilots from other fields of aviation who have lost their medical certificate expect to fly with gliding clubs without restriction. They may not appreciate that gliding requires hard physical work and usually do not outlast this stage! The action recommended is to approve club membership and dual flying, requiring a medical declaration with an endorsement before flying solo.

15.6. The most difficult problem is where the progress of the disease, or the possibility of a relapse, is unpredictable. In such cases the risk must be quantified against other risks because the possibility of sudden illness exists for all individuals. An informed individual can accept risks on his own behalf, it is risks to third parties which lead to limitations by the club and the BGA. In difficult cases, usually of psychiatric illness, the club can insist upon a member seeking and following medical advice.

16. FLIGHT TESTS OF PHYSICALLY DISABLED PILOTS

16.1. In a two seat aircraft on the ground, the forces which can be exerted by the pupil can be estimated, or preferably measured using a spring balance. This is done by the pupil overpowering the instructor in the other cockpit. The control friction is so light that it can be ignored. The Cable Release under tension, and all other ancillary controls should be operated at representative flight loads. Switches and emergency controls must be capable of being operated.

16.2. If a disabled pilot can provide the design control forces shown in Annex 'B', and operate other controls, he may fly without restriction. If he is unable to provide the full forces, he must be cleared by flight test. The flight test is to include both entry to, and exit from steep turns to port and starboard. Side slipping in both directions should be demonstrated because a failure to enter side slips would indicate potential problems with crosswind landings.

16.3. The maximum control forces from a pilot are required to meet extreme conditions of flight. For unrestricted clearance, the disabled pilot should demonstrate the ability to enter a steep turn applying full control deflections. For elevator the pilot should be able to fly the aircraft between stall and the manoeuvre speed with the trim selected at the extreme adverse positions [overpowering the trim]. Cases which need to be considered are flight in extreme turbulence and crosswind landings.

16.4. It is important that any disabled pilot fully understands when a disability restricts the flight envelope of the aircraft, so that potential hazards can be avoided. Crosswind or other limitations may be lower than those to which the aircraft is cleared when flown by able bodied pilots.

17. FLYING OF THE DISABLED AS PASSENGERS

If a request is received to fly a person with a mental or physical handicap, no promise should be made, instead the person should be invited to the club, told that they will be shown round the aircraft and club facilities, allowed to watch the flying, and if conditions are favourable, there is a possibility of a flight. Avoid displaying a dismissive or exclusive attitude. Once at the club, the handicapped person should be under observation for at least an hour while the aircraft and equipment are demonstrated, and flying operations watched and explained. If the patient is seen to be cooperative, self controlled and understanding, a flight can be considered. Do not forget the need for toilet before flying. Unless someone has previous familiarity with flying the disabled, the glider should be flown by the most experienced instructor available. Use a 'side by side' two seater or the rear seat of a tandem aircraft. Explain the cockpit carefully and slowly in the presence of the carer who is escorting the patient. Tell the passenger how to keep their hands

in a safe area and that the controls will move. Explain the sequence of the proposed flight in very simple terms. Limit the duration of the flight to 15-20 minutes, otherwise limited capabilities can be saturated. It has to be understood by all that if an emergency or accident were to occur, there may be an increased risk to the passenger consequent on their inability to escape, use a parachute, or to operate release mechanisms. This increased risk has to be accepted.

18. APPEALS OR COMPLAINTS

If a glider pilot is not content with advice received from their general practitioner, the question should be referred to the BGA medical adviser. If either remains unsatisfied with the proposed outcome, the advice of the Chief Medical Officer, Civil Aviation Authority will be sought. Alternatively the complainant can obtain a JAA Class 2 medical from an AME which gives exemption from the BGA medical declaration. However if it is thought that not all the facts were disclosed to the AME, then the matter should be referred to the CMO, CAA.

19. INVESTIGATION OF FATAL AIRCRAFT ACCIDENTS

The medical investigation of fatal aircraft accidents is the legal responsibility of a pathologist reporting to the coroner, it is necessary to determine whether death took place before impact, or disease contributed to the accident. Specialist pathological investigation of civil aircraft accidents is the responsibility of the Aircraft Accident Investigation Board. When preparing evidence for the Coroner, the aviation pathologist will want to see the medical declaration and may seek lay opinions on the apparent state of health of the pilot. When there are matters of aeromedical importance, function of restraint harness, hazards from other aircraft features, or possible incapacity, the BGA investigating team should include a medical member.

References:

1. Laws and Rules for Glider Pilots, British Gliding Association,
2. National medical guidelines of fitness to drive.
<http://www.dvla.gov.uk/at_a_glance/content.htm>
3. Human factors for pilots. Green, Muir, James, Gradwell & Green. Ashgate. 1991. ISBN 1 85628 177 9
4. Human performance and Limitations in Aviation, Campbell & Bagshaw. Blackwell Science. 1999. ISBN 0-632-04986-3
5. JAR-FCL 3: FLIGHT CREW LICENSING (MEDICAL]
6. Aviation Medicine, Ernsting and King, 1995, Butterworth Heinmann, ISBN 0 7506 2275 X

Medical form still in draft.

EXTRACTS FROM JOINT AIRWORTHINESS REQUIREMENTS JAR22

Subpart B

CONTROLLABILITY AND MANOEUVRABILITY

JAR 22. 143 General

[a] It must be possible to make a smooth transition from one flight condition to another [including turns and slips] without exceptional piloting skill, alertness or strength, and without danger of exceeding the limit load factor, under any probable operating condition.

[c] If marginal conditions exist with regard to required pilot strength, the strength of pilot's limits must be shown by quantitative tests. [In no case may the limits exceed those prescribed in the following table].

	Pitch	Roll	Yaw	Minor controls
Force applied at hand grip or rudder pedal	Da N	Da N	Da N	Da N
Temporary application				
Hand	20	10		20
Feet			40	
Prolonged application				
Hand	2.0	1.5		
Feet			10	

Note: If a disabled pilot can achieve these forces, he or she will have no difficulty with any aircraft certified to JAR 22.

$$\begin{aligned}
 1 \text{ Deca Newton [Da N]} &= 2.25 \text{ lb f} \\
 &= 1.02 \text{ kg f}
 \end{aligned}$$