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New FAA Medical Standards Revise Vision, Hearing, Insulin-treated Diabetic Provisions

The uncorrected-vision and "whisper-test" standards have been eliminated, and a new intermediate-vision standard has been added for first- and second-class certification. Special issuance of an airman medical certificate for pilots who are insulin-dependent diabetics will be possible, but only for third-class certification.

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The U.S. Federal Aviation Administration (FAA) has put into effect major modifications to the medical standards contained in U.S. Federal Aviation Regulations (FARs) Part 67. These modifications recognize characteristics of the modern flight environment, advances in medical science and the overall improvement in the health of pilots. They more closely relate the medical standards to present flight operations.

The FAA said that during the four-month comment period before some of the modifications became final, the agency received more than 5,200 comments, an unusually large number.[1]

Table 1 (page 2) summarizes the medical standards that became effective Sept. 16, 1996.

The 20/20 distance-vision level, with or without correction, is the new standard for first- and second-class medical certification.

[First-class medical certification is required for issuance of an airline transport pilot (ATP) certificate. Second-class medical certification is required for issuance of a commercial pilot certificate.]

The uncorrected-vision standard previously contained in Part 67 was derived from World War I military standards. It has been dropped because today virtually every applicant can obtain a statement of demonstrated ability (waiver).

For third-class medical certification, 20/40 vision in each eye, with or without correction, is the new standard. [Third-class medical certification is required for issuance of a private pilot certificate.]

A "Snellen-equivalent" chart [a standard test of visual acuity presenting letters of graduated sizes to determine the smallest sizes that can be read from a distance] is used at 41 centimeters (16 inches) from the eyes to determine near-vision acuity. The medical standard for near vision is 20/40, with or without correction, for all three certificate classes. The FAA accepts various approved desktop screening devices for determining 20/40 near-vision acuity.

A new requirement of 20/40 or better "intermediate" vision in each eye (Snellen equivalent) has been included in the first- and second-class medical standards. This is measured with or without correction beginning at age 50. Intermediate vision is measured at 81 centimeters (32 inches) with the same chart

Table 1
Changes to U.S. Federal Aviation Regulations (FARs) Part 67 Medical Standards, Effective Sept. 16, 1996, by Certification Type

Medical Standard	First-class (Airline Transport Pilot)	Second-class (Commercial Pilot)	Third-class (Private Pilot)
Distant vision	20/20 or better in each eye separately, with or without correction.		20/40 or better in each eye separately, with or without correction.
Near vision	20/40 or better in each eye separately (Snellen equivalent), with or without correction, as measured at [41 centimeters (16 inches)].		
Intermediate vision	20/40 or better in each eye separately (Snellen equivalent), with or without correction, at age 50 and over, as measured at [81 centimeters (32 inches)].		No requirement.
Color vision	Ability to perceive those colors necessary for safe performance of airman duties.		
Hearing	Demonstrate hearing of an average conversational voice in a quiet room, using both ears at [1.8 meters (six feet)], with back turned to the examiner or pass one of the audiometric tests below.		
Audiology	Audiometric speech-discrimination test. Score at least 70% discrimination in one ear. Pure-tone audiometric test, unaided, with thresholds no worse than:		
	500 Hz	**1,000 Hz**	**2,000 Hz**	**3,000 Hz**
Better Ear	35 dB	30 dB	30 dB	40dB
Worst Ear	35 dB	50 dB	50 dB	60dB
Ears, nose and throat	No ear disease or condition manifested by, or that may reasonably be expected to be manifested by, vertigo or a disturbance of speech or equilibrium.		
Pulse	Not disqualifying, *per se*. Used to determine cardiac-system status and responsiveness.		
Blood pressure	No specified values stated in the standards. Hypertension covered under general medical standard and in the *Guide for Aviation Medical Examiners*.		
Electrocardiogram	At age 35 and annually after age 40.	Not routinely required.	
Mental	No diagnosis of psychosis, bipolar disorder or severe personality disorder.		
Substance dependence and substance abuse	A diagnosis or medical history of "substance dependence" is disqualifying unless there is established clinical evidence, satisfactory to the Federal Air Surgeon, of recovery, including substained total abstinence from the substance(s) for not less than the preceding two years. A history of "substance abuse" within the preceding two years is disqualifying. "Substance" includes alcohol and other drugs (i.e., PCP, sedatives and hypnotics, anxiolytics, marijuana, cocaine, opioids, amphetamines, hallucinogens and other psychoactive drugs or chemicals).		
Disqualifying conditions **Bold** print depicts new disqualifying conditions as of Sept. 16, 1996. Substance dependence and abuse replace drug dependence and alcoholism.	Examiner must disqualify if the applicant has a history of: (1) Diabetes mellitus requiring medication*; (2) Angina pectoris; (3) Coronary heart disease that has been treated or, if untreated, that has been symptomatic or clinically significant; (4) Myocardial infarction; (5) **Cardiac valve replacement**; (6) **Permanent cardiac pacemaker**; (7) **Heart replacement**; (8) Psychosis; (9) **Bipolar disorder**; (10) Personality disorder that is severe enough to have repeatedly manifested itself by overt acts; (11) **Substance dependence;** (12) **Substance abuse**; (13) Epilepsy; (14) Disturbance of consciousness without satisfactory explanation of cause; and (15) **Transient loss of control of nervous system function(s) without satisfactory explanation of cause**.		

Hz = Hertz dB = Decibel(s) PCP = phenylcyclohexyl piperidine
*Modified on Dec. 23, 1996, for third-class certification.

Source: *Federal Air Surgeon's Medical Bulletin*

used for measuring near vision. This standard does not apply to the third-class medical certificate.

The intermediate-vision standard was introduced because it relates to the pilot's need to see the instrument panel clearly. Some pilots may have trouble seeing small indicator displays because of normal presbyopia (farsightedness — age-related loss of elasticity in the eye's lens that causes difficulty in focusing on close objects).

A major change in the medical standards is the elimination of the "normal–color vision" requirement for first-class certification and of the requirement for the ability to perceive aviation red, aviation green and white for second-class and third-class certification. The new standard is "the ability to perceive those colors necessary for safe performance of airman duties."

In the past, virtually all pilots who missed certain colored dots on charts during their periodic physical examination

could receive a statement of demonstrated ability by taking a color-signal light test at an FAA facility. Many persons who had good potential as pilots were denied access to careers because of the now-outmoded color-vision medical standards.

The new first-, second- and third-class medical hearing standard is the ability to hear an "average conversational voice in a quiet room, using both ears at [1.8 meters (six feet)], with the back turned to the examiner." A speech-discrimination test using one ear or pure-tone audiometric test can be substituted for the conversational-voice test. The earlier "whispered-voice" standard does not relate to the modern flight-deck environment and has been eliminated.

The new medical standards provide that no ear disease or other condition be present that is "manifested by, or that may reasonably be expected to be manifested by, vertigo or a disturbance of speech or equilibrium." [Vertigo is a sensation of dizziness or spinning. It can result from, among other causes, increased pressure in the inner ear because of fluid accumulation.]

The pulse rate is used to determine cardiac-system status and responsiveness. No fixed upper or lower number of pulse beats per minute is required. Some healthy individuals in outstanding physical cardiovascular condition can have very low pulse rates. In addition, individuals who are nervous about their periodic medical certification examinations can have pulse rates that are unusually high only during the examinations. The examiner uses clinical judgment in assessing these individual differences. Pulse-rhythm abnormalities are noted and evaluated.

"Substance abuse" within the preceding two years is disqualifying.

There are no specified values for blood pressure in the new medical standards. Some pilots demonstrate elevated blood pressure because they are undertaking a flight physical exam. Formerly known as "white-coat hypertension," elevation of blood pressure in this situation is now called "office hypertension."

Various drugs are available to treat most cases of genuine hypertension, and because the FAA recognizes the value of preventing the complications of untreated hypertension, it will authorize medical certification if a specific treatment program produces no adverse side effects for an individual pilot.

For first-class medical certification, a resting electrocardiogram must be furnished, first at age 35 and annually after the age of 40. The FAA did not adopt a new requirement for resting electrocardiograms (ECGs) for second-class certification. "A recent review of current certification practices," the FAA said, "found that airmen whose history and examinations indicate [that] ECGs or other tests are needed obtain the testing before receiving certification. It was determined that additional requirements would not result in further strengthening the level of safety in this area."

Most of the ECGs for first-class certification are transmitted electronically to the FAA Civil Aeromedical Institute (CAMI) and screened initially by computer software. ECG transmission in this format is the initial stage of what will eventually become electronic transmission of the entire medical examination.

The medical standards provide that for all three classes of medical certification, there must be no history or diagnosis of psychosis, bipolar disorder (a new disqualifying condition) or severe personality disorder. This mental medical-standard category is based on the premise that flight crew performance, especially by the pilot-in-command, must be based on accurate reality assessment to be safe.

Persons with psychotic thought processes are, by definition, out of touch with reality. Bipolar disorder is characterized by mood shifts between mania and depression. [Mania is excitement of psychotic proportions, manifesting as mental hyperactivity, involving mood elevation and grandiose thoughts, and physical hyperactivity. Depression is a condition that can include prolonged feelings of sadness and low self-esteem, withdrawal from social interaction, loss of interest in activities and poor appetite.] The presence of severe mania or depression is incompatible with sound decision making and consequent safe behavior. Severe personality disorders can result in flight activities that ignore or violate regulations.

A diagnosis or a medical history of "substance dependence" is disqualifying, unless established clinical evidence of recovery with sustained, total abstinence from the substance or substances exists for the preceding two years. This evidence must be satisfactory to the Federal Air Surgeon.

"Substance abuse" within the preceding two years is disqualifying. "Substances" for which there is a potential for abuse include alcohol and various mood-altering drugs (hypnotics, marijuana, cocaine, opiates, amphetamines, sedatives, phenylcyclohexyl piperidine [PCP], hallucinogens, anxiolytics, glue vapors and other psychoactive drugs). Flight operations are reality-based, and the individual who uses these substances is at risk of losing touch with reality. Dependence on and use of these substances results in mental departures from reality (which is the purpose of using these substances — to change the user's perception of reality by modifying the central nervous system). Nicotine and caffeine are not included in the standard.

"A verified-positive drug-test result under a U.S. Department of Transportation (DOT) drug-testing program will become the basis for medical disqualification," the FAA said.

Previously, a medical examiner's diagnosis of drug dependence was needed for disqualification.

The new rule includes as disqualifying conditions for all classes of medical certificate heart replacement, permanent cardiac pacemaker implantation and cardiac-valve replacement. "The FAA will continue, however, to certify through a waiver process those applicants whose conditions are stable and who individually have been determined to be safe," the FAA said.

Under FARs Part 61, a first-class medical certificate is valid for six months, with an additional six months as a second-class certificate and an additional year as a third-class certificate. A second-class certificate is valid for 12 months, with an additional year as a third-class certificate. A third-class certificate under the new regulations is valid for three years if the individual is under the age of 40. For those over 40, the third-class certificate is valid for two years.

An issue that remains to be determined is the duration of a student pilot third-class medical certificate following the two-year duration of the student pilot certificate. Because this is a combined student pilot–third-class certificate, the student pilot certificate will expire in two years regardless of the medical portion, and this may automatically invalidate the associated third-class medical certificate.

A separate new rule that became effective Dec. 23, 1996, ended the absolute ban on pilots with insulin-treated diabetes mellitus (ITDM), although the change applies only to third-class medical certification. [Diabetes mellitus is a disorder in which the body is unable to produce enough insulin, a hormone that regulates the metabolism of glucose (blood sugar), the body's main energy source. A variation involves the inability to use the insulin produced. The result, in either case, is excessive blood sugar.]

A new rule ended the absolute ban on pilots with insulin-treated diabetes mellitus (ITDM).

FAA policy for certification of pilots with ITDM has long been controversial, and will probably continue to be so because the new ruling can be seen as a precedent that could eventually be expanded to include other classes of medical certification. In February 1991, the American Diabetes Association (ADA) petitioned the FAA to permit ITDM individuals to be issued airman medical certificates on a case-by-case basis, and also advocated the creation of an FAA-appointed medical task force to develop a medical protocol to be used in case-by-case reviews. In December 1994, the FAA published a notice of its intent to consider a policy change concerning ITDM individuals who apply for airman medical certificates.

The agency invited comments from the aviation and medical communities and the public, including opinions on whether ITDM individuals should be restricted by class of medical certificate (e.g, third class only), by class of airman certificate (e.g., private pilot only) or by operational limitation (e.g, dual-pilot operation only or a prohibition of multi-engine aircraft operation).

The FAA said that it received comments on the notice from "93 pilots; 26 medical organizations, including university-affiliated associations and diabetes treatment centers; 150 physicians, including 13 aviation medical examiners; two aviation trade associations; and 541 private individuals and members of Congress."

The agency said that the American Association of Clinical Endocrinologists (AACE) "opposed any policy change which would permit ITDM individuals to be eligible for medical certification. [AACE] stated that the associated risks of this disease cannot be eliminated and that granting medical certification would pose unnecessary risks to both the patient and the general populace. AACE contended that the physiological effects of flight and the constraints of operating an aircraft decrease the likelihood of proper monitoring and management of blood glucose levels while in flight and increase the risk of impairment [or] incapacitation of ITDM individuals."

Five FAA aviation medical examiners (AMEs) "urged restriction of medical certification to private pilots," the FAA said. "Three of these AMEs stated that if the program with those restrictions proved successful, the program should be extended after a period of time to include first- and second-class medical certification. ...

"There was a divergence of opinion as to the class of airman medical certificate that should be offered under a special issuance, with the majority of individual commenters stating that special issuance should be offered for all classes of airman medical certification. A smaller but significant number of respondents advocated granting special issuance of third-class medical certificates only."

The Endocrine Society "opposed any change of FAA policy regarding ITDM individuals. The Society stated that, if a special issuance of a medical certificate is to be granted, an ITDM individual who has had even one severe hypoglycemic reaction within the last three years should not be eligible ... . It further contended that food ingestion should never be permitted in lieu of hourly in-flight glucose testing, that an ITDM individual should have another qualified pilot in the cockpit at all times and that an ITDM individual should not be allowed to pilot commercial aircraft."[2]

Although it arrived at its position independently rather than as a response to the new FAA rule, the Aerospace Medical Association (AsMA) does not endorse the ruling. Russell B. Rayman, M.D., AsMA executive director, noted that

"individuals with diabetes are at risk for long-term complications including renal [kidney] disease, blindness, neurological dysfunction and vascular disease. All of these are very serious complications. According to a recent authoritative study published in the *New England Journal of Medicine*,[3] the risk of long-term complications is greatly reduced if there is tight and rigid control of the patient's blood-sugar level.

"We feel that there is an inherent risk to tight and rigid control because of the nature of the flying environment and because some pilots may opt to remain slightly hyperglycemic (with increased blood sugar) to avoid the complications of hypoglycemia (low blood sugar). There may also be an inducement to remain hyperglycemic to avoid further testing in flight as well as the necessity to take sugar in flight if the blood sugar is low." Dr. Rayman said that the AsMA had concluded that "this would not be in the best interest of the aviator's health in the long run."

The FAA reported that the American Diabetes Association (ADA) "urged the implementation of a policy without restriction to class of medical certificate, class of airman certificate or by operational limitation. ... ADA stressed the need for case-by-case review of ITDM individuals. The [ADA] stated that, just as not all nondiabetic persons should be certified, not all individuals with ITDM should be certified. The ADA stated that individuals who are not impacted by diabetic conditions affecting judgment and performance in the cockpit should be considered for medical certification. [But] they advocated exclusion of ITDM individuals at highest risk for incapacitation (e.g., history of hypoglycemic reaction resulting in unconsciousness and episodes of severe hypoglycemia without warning symptoms or recurrent severe hypoglycemia)."

Procedures for glucose management prior to flight, during flight and prior to landing are specified.

In announcing the new ruling, the FAA said that "the Federal Air Surgeon has found that advancements in the knowledge, treatment and self-management of diabetes have made certification of ITDM individuals possible under certain circumstances. More efficient techniques for self-monitoring blood glucose, a better understanding of the dietary needs of diabetic individuals and the improved education level of diabetic individuals result in better control of diabetes, enabling an individual to significantly mitigate the risk of hypoglycemia." Hypoglycemia, a condition of low blood sugar that is the converse of diabetes, can sometimes result from "overtreating diabetes." In extreme cases, hypoglycemia can cause loss of consciousness. Pilots using oral blood sugar–lowering drugs or special diets, rather than insulin, for treatment have been eligible for waivers since 1986.

An insulin-treated diabetic pilot can now be considered for special issuance of a third-class airman medical certificate. Among other qualifying conditions, the pilot must have had no recurrent hypoglycemic reactions resulting in loss of consciousness, seizure or impaired cognitive function, or requiring intervention by another person, within the previous five years. Results of a complete medical evaluation by an endocrinologist or other diabetes specialist physician must be submitted.

A pilot with ITDM who has been issued an airman medical certificate must submit to a medical evaluation by a specialist every three months; carry and use a digital blood-glucose measuring device with memory; provide daily records of blood-glucose measurement for review at the three-month evaluation; and provide other medical information in accordance with a protocol required by the FAA.

Procedures for glucose management prior to flight, during flight and prior to landing are also specified. A pilot with ITDM must maintain "appropriate medical supplies for glucose management at all times," including an FAA-acceptable blood-monitoring device with memory, supplies needed to obtain blood samples and a supply of rapidly absorbable glucose.

The pilot with ITDM must measure his or her blood glucose level within one-half hour before takeoff; one hour after the beginning of the flight; at each successive hour of the flight; and within one-half hour before landing. Blood glucose concentration should measure between 100 milligrams per deciliter and 300 milligrams per deciliter. If the blood glucose concentration is too low, the pilot must ingest a 20-gram glucose snack and recheck and document the blood glucose concentration measurement after one hour. If the blood glucose concentration is too high, "the individual shall land as soon as practicable at the nearest suitable airport."

Acknowledging that these requirements might at times be superseded by practical realities, the rule adds:

"The individual, as pilot, is responsible for the safety of the flight and must remain cognizant of those factors that are important in its successful completion. Accordingly, in recognition of such elements as adverse weather, turbulence, air traffic control changes or other variables, the individual may decide that a scheduled, hourly measurement of blood glucose concentration during the flight is of lower priority than the need for full, undivided attention to piloting.

"In such cases, the individual shall ingest a 10-gram glucose snack. One hour after ingesting this glucose snack, the individual shall measure and document his or her blood glucose concentration. If the individual is unable to perform the measurement of his or her blood glucose concentration for the second consecutive time, the individual shall ingest a 20-gram glucose snack and shall land as soon as practicable at the nearest

suitable airport. The individual, under these circumstances, is not required to measure and document his or her blood glucose concentration within one-half hour prior to landing."[4]♦

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4. *Federal Register, op. cit.*

Further Reading from FSF Publications

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