FEDERAL AVIATION AGENCY
BUREAU OF AVIATION MEDICINE
Washington 25, D. C.

June 16, 1960

CIVIL AIR REGULATIONS DRAFT RELEASE NO. 60- 11

SUBJECT: Physical Standards for Airmen; Medical Certificates

The Bureau of Aviation Medicine of the Federal Aviation Agency has under consideration a proposal to amend sections 29.2 and 29.3 of Part 29 of the Civil Air Regulations. The reasons therefor are set forth in the explanatory statement of the attached proposal which is being published in the Federal Register as a notice of proposed rule making.

The Bureau of Aviation Medicine desires that all persons who will be affected by the requirements of this proposal be fully informed as to its effect upon them and is therefore circulating copies in order to afford interested persons ample opportunity to submit comments as they may desire.

Because of the large number of comments which we anticipate receiving in response to this draft release, we will be unable to acknowledge receipt of each reply. However, you may be assured that all comments will be given careful consideration.

It should be noted that comments must be submitted in duplicate to the Docket Section of the Federal Aviation Agency, and in order to insure consideration, must be received by August 15, 1960.

Civil Air Surgeon

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[14 CFR 29]

[Reg. Docket No. 424 ; Draft Release 60-11]

PHYSICAL STANDARDS FOR AIRMEN; MEDICAL CERTIFICATES

NOTICE OF PROPOSED RULE MAKING

Pursuant to the authority delegated to me by the Administrator (§ 405.27, 24 F.R. 2196), notice is hereby given that the Federal Aviation Agency has under consideration a proposal to amend Civil Air Regulations, Part 29, sections 29.2 and 29.3, as hereinafter set forth.

Interested persons may participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Communications should be submitted in duplicate to the Docket Section of the Federal Aviation Agency, Room B-316, 1711 New York Avenue, N.W., Washington 25, D.C. All communications received on or before August 15, 1960, will be considered by the Administrator before taking action upon the proposed rule. The proposals contained in this notice may be changed in the light of comments received. All comments submitted will be available in the Docket Section for examination by interested persons when the prescribed date for the return of

comments has expired. Because of the large number of comments anticipated in reply to this notice, we will be unable to acknowledge receipt of each reply.

Existing vision standards and vision testing procedures applicable to civil airmen have been carefully reviewed by the Bureau of Aviation Medicine. Vision standards now applicable to civil airmen were developed over the years since the passage of the Air Commerce Act of 1926. Some of the existing standards are still essentially those established by the Aeronautics Branch of the Department of Commerce in 1926. In 1926 a transport pilot was required, among other things, to have "normal judgment of distance; and only slight defects of ocular muscle balance." By 1928, depth perception requirement was first given a specific value, namely 30 mm. without correcting glasses on the average of three trials on the Howard-Dolman depth perception apparatus. The presence of diplopia and a finding of 8 diopters of adduction when the value for abduction was less than 4 diopters were at that time regarded as disqualifying for all classes of pilots. Hyperphoria of more than 1 diopter barred the medical certification of limited commercial and transport pilots.

The present numerical values for esophoria and exophoria are the same as those established in 1939 for application to the Civilian Pilot Training Program in selecting potential military aviators. The

standards were made with consideration of the needs of mobilizing for defense at that time and of necessity, were made to coincide with the then military standard. These were later formally incorporated, without change, into Civil Air Regulations, Part 29 (May 22, 1942).

Despite the longstanding existence of rules pertaining to tests for depth perception and eye muscle balance, they have, for some time, not served as standards for disqualification. Except in the case of very gross eye muscle imbalance, applicants with values in excess of those published have been given an opportunity to accomplish a flight test to demonstrate ability to fly safely despite disqualifying values for depth perception, esophoria, exophoria, hyperphoria, prism divergence or prism convergence.

Such applicants, who did not in addition have other major disturbances in visual function, were uniformly able to demonstrate that failure to meet such standards did not significantly affect their ability to perform safely the applicable airman duties. Pilots in this category have been issued medical certificates attesting to their physical fitness to exercise those rights and privileges for which their ratings are held. Accordingly, the finding of disqualifying values for these tests in pilot applicants has not been predictive of lack of ability to perform, except in rare instances where major eye muscle imbalance or other major visual deficiency was present.

The Agency's experience in the application of these standards is consistent with that of others whose reports in the medical

literature fail to establish that performance of airman duties deteriorates as a consequence of excessive values for these test items.

On the basis of these considerations, which raise doubt concerning the need to continue tests which appear to have little relationship to ability to perform, the assistance of medical scientists with expert knowledge in this field was sought. Five highly qualified ophthalmologists were appointed as consultants to the Civil Air Surgeon. They were given the existing eye standards, together with a detailed description of the manner in which they are administered and the policies which govern their application. After the individual consultants had had an opportunity to study these matters and exchange views with their colleagues, a meeting was arranged between the consultants, the medical staff of the Agency and military medical observers. This provided an interchange of views on the technical and administrative considerations of existing eye standards prescribed in the Civil Air Regulations and the testing procedures applied in examining airman applicants.

The recommendations which resulted from this analysis confirmed the previous observations that heterophoria, depth perception, and duction testing, per se, could be expected to give little indication of the visual proficiency necessary for safe performance of airman

duties. In the course of developing these recommendations, it became evident that medical knowledge gained since standards for these items were adopted would justify their elimination without sacrificing air safety.

It was determined that the prescribed test for depth perception ability, in testing binocular parallax, gave little additional information beyond that which could be obtained by adequate tests for visual acuity. It was also found that a test for binocular parallax provides a measure of only one of the several factors determining depth perception ability. This factor is of very little assistance to the pilot in carrying out those tasks which require an appreciation of depth and distance relationships. This lack of value stems from the fact that binocular parallax provides usable depth judgment information to a distance probably not greater than 30 inches. The tasks which require an appreciation of depth in flying are those involving objects at much greater distances, where several other factors of depth perception ability are operative. It was determined that there are no existing tests, which could be reasonably applied in a medical examination, for the assessment of those components of depth judgment of importance to pilots. It was the consensus of the consultants that observation of pilot proficiency in the actual operation of aircraft would provide sufficient

defects is quite rare. It has been estimated that less than one person in 1,000 would be found who did not possess these attributes. This rate is considerably lower than that of persons who have what are now considered, by the existing standards, to be disqualifying values for esophoria, exophoria, hyperphoria, prism divergence and prism convergence.

Since only qualified eye specialists could adequately determine the values in these rare instances, the general eye examination, performed by persons other than eye specialists as a part of the general medical examination, should be designed to separate out that group of applicants most likely to lack these attributes. After consideration of the several screening methods which could be applied, it was determined that tests for esophoria, exophoria and hyperphoria, with the establishment of maximum values for each, would achieve such separation.

The values which are considered determinative for this separation are 1 prism diopter of hyperphoria, 6 prism diopters of esophoria and 6 prism diopters of exophoria. These values are established as limits for screening and not as disqualifying limits. The screening limit for hyperphoria is the same as the present standard for disqualification, 1 prism diopter. The screening limit for exophoria is 1 prism diopter higher, and therefore more

liberal, than the present standard for disqualification. The screening limit for esophoria is lower by 4 prism diopters, and therefore more restrictive, than the present standard for disqualification.

The adverse effect on ability to perform airman duties safely is cause for concern only in those few who lack bifoveal fixation or who have inadequate vergence-phoria relationship. Identification of these persons will form the basis for disqualification. This proposal would amend the Civil Air Regulations for the purpose of limiting disqualification to those rare individuals who lack bifoveal fixation or have inadequate vergence-phoria relationship, and thus grants considerable relief to airman applicants in terms of numbers of persons whose qualification would otherwise be in question.

Studies of the medical literature provided reasonably precise information concerning the numbers of persons who would be expected to fail by the existing standards when tests are carefully conducted. For depth perception, some 6 percent or more would fail. For prism divergence, approximately 10 percent would fail. For prism convergence, from 12 to 14 percent would be expected to fail. Data are not available for diplopia or as to the number of individuals in which more than one of the disqualifying defects

would be found. The standard prescribed in this proposal would reduce disqualifications for these factors to not more than one person in 1,000 applicants, and would probably require special testing only in approximately 3 percent. This low rate is expected despite the fact that the screening limit for esophoria is somewhat lower than the present disqualification limit.

In consideration of the foregoing, the standards contained in sections 29.2 (a) (2), (3), (7), and (8) and 29.3 (a) (2), (3), and (5) are being rescinded in a separate action being issued concurrently with this proposal.

The amendment proposed herein would, in summary, establish a screening procedure in place of the rescinded standards noted above. The proposed amendment clearly provides that medical certificates will not be withheld from those few applicants who might fail the screening test. They might be required, however, to be examined further to determine if they possess the degree of eye muscle balance deemed necessary for proper visual function.

In consideration of the foregoing, it is hereby proposed to rescind those standards for hyperphoria, esophoria, and exophoria presently contained in Section 29.2 and the standard for hyperphoria in Section 29.3 and simultaneously to amend Part 29 of the Civil Air Regulations, (14 CFR 29) as follows:

1. By amending § 29.2 (a) by adding a new paragraph to read as follows:

§ 29.2 First Class

(a) Eye. Applicant shall have:

* * * * * * * * * *

Bifoveal fixation and a vergence-phoria relationship sufficient to prevent a break in fusion under conditions which may reasonably occur in the performance of airman duties. Tests for these factors will not be required except in those applicants who are found to have more than one prism diopter of hyperphoria, six prism diopters of esophoria, or six prism diopters of exophoria. When the above values are exceeded, the Civil Air Surgeon may require the applicant to undergo examination by a qualified eye specialist to determine if bifoveal fixation and adequate vergence-phoria relationship exist. A medical certificate will be issued pending the results of such examination.

2. By amending §§ 29.3 (a) by adding a new paragraph to read as follows:

§§ 29.3 Second Class

(a) Eye. Applicant shall have:

* * * * * * * * * *

Bifoveal fixation and a vergence-phoria relationship sufficient to prevent a break in fusion under conditions

which may reasonably occur in the performance of airman duties. Tests for these factors will not be required except in those applicants who are found to have more than one prism diopter of hyperphoria, six prism diopters of esophoria, or six prism diopters of exophoria. When the above values are exceeded, the Civil Air Surgeon may require the applicant to undergo examination by a qualified eye specialist to determine if bifoveal fixation and adequate vergence-phoria relationship exist. A medical certificate will be issued pending the results of such examination.

These amendments are proposed under the authority of Sections 313(a), 601, 602 of the Federal Aviation Act of 1958, (72 Stat. 752, 775, 776; 49 U.S.C. 1354(a), 1421, 1422.)

JAMES L. GODDARD, M. D.
Civil Air Surgeon

Issued in Washington, D. C. on June 16, 1960