

BRITISH STANDARDS INSTITUTION

SUB-COMMITTEE M/48/4 : OPHTHALMIC TEST TYPES

(1) Sub-committee M/48/4 has been working on a draft Standard for Ophthalmic Test Types. A review of the previous literature of the subject has shown that many previous attempts at standardization, whether in separate countries or in the international field, have proved largely abortive because of differences on certain basic questions.

(2) The present Sub-committee, realizing that any Standard for Ophthalmic Test Types will succeed only if it commands widespread approval, requests the views of readers on certain controversial points that have already caused difficulty in committee.

A. Style and Selection of Test Letters

(3) Since it is clear that serif letters of the original Snellen design are now in general disfavour, the Sub-committee has already decided in favour of non-serif letters. The selection of letters is still a disputed question. There appear to be two main schools of thought. According to one, it is desirable that all the letters used should be of approximately equal legibility; otherwise the standard of acuity represented by one chart may differ significantly from that of another chart. Also, if the letters differ too greatly in their relative legibilities, the recording of acuity becomes more uncertain because the difference in legibility between the easiest and most difficult letters is greater than the difference in size between adjacent lines of the chart.

(4) According to the other school of thought, each of the smaller lines of the chart should contain at least one letter of relatively greater difficulty than the others, and ability to read the whole line, including these difficult letters, should be the criterion for recording the visual acuity, at least for medico-legal purposes. For clinical purposes, finer distinctions, such as 6/9 minus 1, would be admissible.

(5) A considerable amount of work has been done by different investigators over a long period of time to determine the relative legibilities of the different letters of the alphabet. Clearly, this depends on a number of factors, including the style of letters used and the proportions of the letters. For example, some of the non-serif letters in current use are constructed on a rectangular framework 5 units in height and 4 units in width (designated as 5×4), whereas others are constructed on a square (5×5), resulting in a broader letter that is generally easier to read.

(6) According to the best information available (the separate researches of Coates and Woodruff), the non-serif letters listed in the following table do not differ in their relative legibilities by more than plus or minus 10 per cent. of the mean. They would

therefore provide an adequate selection of letters of medium legibility for charts based on the principle of approximately equal legibility.

TABLE
NON-SERIF LETTERS OF MEDIUM LEGIBILITY

<i>5 × 5 Letters</i>		<i>5 × 4 Letters</i>	
X	0·91	V	0·90
Y	0·95	R	0·91
C	0·97	D	0·93
R	0·97	N	0·99
O	1·00	H	1·00
Z	1·05	F	1·04
K	1·07	P	1·04
P	1·08	Z	1·05
D	1·10	E	1·05
		U	1·08

The relative legibility tabulated is the mean of the results obtained by Coates and Woodruff.

This selection omits A, L, and T as being too easy; B, G, M, and S (relative legibility 0·61 to 0·80) as being too difficult; and I, J, Q, and W as being unsuitable in non-serif form.

(7) The Sub-committee would therefore welcome opinions on the following questions:

- (a) Would you be in favour of restricting the selection of letters to those listed in the Table above?
- (b) If so, would you be in favour of a requirement that each of the smaller lines of the chart should include at least some of the more difficult letters from this selection?
- (c) Would you favour the inclusion of at least one of the "too difficult" letters (B, G, M, and S) on the smaller lines of the chart, the criterion for recording the acuity being that every letter on the line must be distinguished?

B. Range and Progression of Sizes

(8) From a theoretical point of view there can be little doubt that the progression of sizes should be such that the size of the letters on any given line bears a constant ratio to the size of the preceding line. The successive sizes then form, mathematically, a geometrical progression.

A large number of different ratios has been proposed from time to time, the most favoured being $\sqrt{2}$ and $\sqrt[3]{2}$. In the former series, the size doubles at every second interval, and in the latter at every third interval.

(9) The traditional progression of sizes most commonly used in Great Britain is very close to a geometrical progression based on $\sqrt{2}$, as shown by the following table:

Traditional progression	6/6, 6/9, 6/12, 6/18, 6/24, 6/36, 6/60.
Geometrical progression	6/6, 6/8·5, 6/12, 6/17·0, 6/24, 6/33·9, 6/48, 6/67·9.

(10) The advocates of a true geometrical progression are not averse to a reasonable degree of rounding-off, but are in favour of a logical continuation of the sizes

whereby they continue to double at every other line. This would give rise to the series

6/6, 6/9, 6/12, 6/18, 6/24, 6/36, 6/48, 6/72, 6/96

and so on if it is desired to continue the progression so as to provide the basis for a Visual Efficiency Scale or for charts specially designed to cater for sub-normal acuities. On the other hand, there is opposition to the idea of abandoning the long-cherished 6/60 line.

(11) The question therefore is

(d) Would you be in favour of adopting the amended progression of sizes given in paragraph (10)?

C. Sizes Smaller than 6/6

(12) The $\sqrt{2}$ progression yields two conceivably useful sizes smaller than 6/6, namely, 6/4·2 and 6/3. On the basis of 6/9 and 6/18 there would be a case for rounding-off 6/4·2 to 6/4·5, but opposition has been expressed to the use of decimal places in recording acuity, despite the fact that a 6/7·5 line is included in a number of charts.

(13) Another idea that has been suggested is to make the smaller lines 6/4·2 and 6/3, but to label the former 6/4·5 or 6/4 as may be decided.

(14) Finally, disagreement has arisen over the desirability of including a 6/3 line at all.

(15) To enable the Sub-committee to give further consideration to these difficult issues, replies are also sought to the following questions:

(e) Which of the following progressions of the smaller sizes would you favour?

(i) 6/6, 6/4·5, 6/3

(ii) 6/6, 6/5, 6/4, 6/3

(abandoning the $\sqrt{2}$ progression)

(f) Are you in favour of including a 6/3 line at all?

(g) If you favour (i) in question (e), would you also be in favour of making the *actual* size of this line 4·2?

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