1978 IPS Perimetry Standards

IPS PERIMETRIC STANDARDS, 1978

1. Definitions of Perimetry and of the Visual Field

Perimetry is the measurement of visual functions of the eye at topographically defined loci in the visual field. The visual field is that portion of the external environment of the observer wherein the steadily fixating eye(s) can detect visual stimuli.

2. Need for Specifications and Tolerances

The fundamental purpose of standardization is to provide a common framework for measurement. This allows exchange and comparison of information obtained at different times and in different places. If a common measurement scheme can be achieved, then development upon that base can proceed in an orderly manner.

In perimetry few standards exist and certain of these are imperfectly specified. This situation needs to be rectified.

Specification also implies consideration of tolerances. Tolerances include instrument setting accuracy as well as measurement accuracy. Because tolerances in a clinical office are not comparable with those achievable in a research laboratory, an effort will be made to set standards which define conditions where small errors do not significantly alter results or interpretations of data.

3. Applicability of this Standard

This standard is written for all individuals engaged in perimetry and especially for clinicians for use in their offices, departments and clinics. It is directed also towards the manufacturer who provides visual field test equipment. These standards also set minimum criteria for reporting research results. The goal is to set a reasonable minimum set of standards for testing of the visual field. Note that different requirements or strategies may be needed for different tasks.

4. Specifications of Magnitudes and Units

This committee makes use of the International System of Units published by the International Bureau of Weights and Measures (Le Systeme International d'Unites, 1970, OFFILIB, 48 Rue Gay-Lussac, F-75005, Paris, F Revised edition 1977). See also: The International System of Units, NBS Special Publication 330, 1977, Department of Commerce, National Bureau of Standards, US Government Printing Office, Washington DC 20402 (SD Catalogue No. C13.10:330/4). Supplemental use is made of the Vocabulary of the Commission Internationale de l'Eclairage (International Lighting Vocabulary of the Commission Internationale de l'Eclairage, 3rd ed;, 1970, Bureau Central de la CIE, 4 Avenue du Recteur Poincare, F-75016, Paris, France).

In the Proceedings (Acta) of the XXIInd International Ophthalmological Congress, Paris, 1974, p78 and 93, the Concilium Ophthalmologicum Universale published recommendations regarding the use of the International System of Units in ophthalmological practice.

There is on record an earlier international standard on perimetry which was published by the XIII Concilium Ophthalmologicum 1929, Hollandia, NV Boek- en Steendrukkerij, Edward Ijdo, Leiden, 9 pages. The present document is meant to supercede this earlier standard.

Recently the Committee on Vision, the National Research Council, National Academy of Sciences of the United States of America published the "First Interprofessional Standard for Visual Field Testing," National Academy of Sciences, Washington, DC, 1975. Certain aspects of the present document are based upon this publication.

5. Photometric Specification

For proper control of visual stimuli in perimetry, provision of one or more light sources is necessary. That is, the background, test stimuli, and all supplementary targets or display fields need to be specified photometrically.

The specification of visual stimuli is complex. Properly, radiant energy determinations should be made, followed by suitable luminous conversions for different field areas and stimulus conditions. For most practical clinical situations the IPS recommends that the visual stimulus in perimetry be specified in luminance units measured at the center of the entrance pupil of the eye. The visual stimulus is essentially defined by this luminance, the direction of the stimulus in the field of view and the area of the entrance pupil of the eye. Since we often cannot control pupil size in the clinical environment, the least we can achieve is to specify luminance at the center of the entrance pupil of the eye, and to request the examiner to record this luminance and the entrance pupil size at the time of the measurement. In certain conditions special additional calibration requirements exist, e.g. for short duration or coloured stimuli.

We ask the manufacturer to specify the operating conditions of his instrument. ideally this would include the complete specifications of lamps, filters (including transmission curves), and desired operating conditions. Luminance at the center of the entrance pupil of the eye should be specified for defined operating conditions of properly centred light sources and associated optics. Similarly, the spectral distribution at the entrance pupil of the eye should be defined. In addition, definition of desired operating colour temperature and CIE co-ordinates is highly desirable. A simple scheme for assuring that the instrument is functioning within reasonable tolerances of these specified values should be provided. Included would be some test of luminance and/or indication for replacement of light sources.

The international unit of luminance is the candela per meter squared, cd/m2 or cd.m-2. Other units are now regarded as obsolete. Although strictly speaking not the same units2, conversion to apostilb and millilambert values can be made using the following relationships:

10/p candela/m2 = 1 millilambert = 10 apostilbs,

where 10/p = 3.183 (approximate)

While this group would prefer luminance measurement of perimetric devices by objective small field test instruments, an acceptable alternative would be to provide a measure convertible into luminance at the of the entrance pupil of the eye.

6. Background or Adapting Luminance

A. Specification of luminance

For routine perimetric instruments used in clinical offices it is recommended that a value of background luminance be chosen such that it is photopic and it falls within that range of background luminances over which the Weber fraction remains constant, *ie,* DL/LB = constant.3 DL is defined as the just detectable luminance difference between test target and background,4 and LB is background luminance (also see section on contrast). The proposed background level is generally higher than that found in perimeters in use today. This setting criterion is recommended because (a) it requires less sensitive calibration equipment, (b) it is less sensitive to modest fluctuations (or changes) in light source output, (c) the result is less dependent upon modest variations in eye pupil size, (d) visual functions are tested at clearly defined photopic levels, and (e) fixation control is easier than at low luminance adaptation levels.

If this background luminance cannot be achieved, it is recommended that for routine office purposes no less than 10 candelas/m2 be used. A background luminance of 10 candelas/m2 is below, but near the level where DL/LB = constant over an extended range of values.

Other light or adaptation levels offer advantages. Lower levels may provide an extended range of contrast values for testing, cataract patients may be better evaluated, and rod anomalies may be more effectively studied, etc. Thus, where adequate calibration capability exists and careful studies are conducted to rule out loss of confidence due to increased measurement variance, lower photopic or mesopic background luminance levels can serve a useful purpose. Similarly, higher background luminance values can be useful in test of the visual fatigue factor or for the development of colour perimetric tests.

Thus the IPS recommends that instruments be constructed to be capable of calibration over a range of values. The IPS suggests that the standard be a minimum test condition rather than a limiting condition. We encourage careful research on this rather complex and crucial set of questions. We recognise that stability of determinations in special disease conditions, e.g., glaucoma, cataract, chorioretinal degenerations, optic neuropathies, etc., may require use of special or specific background luminance levels and special purpose instruments suitable for advanced diagnostic laboratories.

2 See discussion in the recently published US Standard relative to this point.

3 For example, see E Aulhorn, H Harms, and M Raabe, Documenta Ophthal. 20, 538-556, 1966; and J Enoch, Physiology (Chapter 3, pp 202-289) in A Sorsby, Modern Ophthalmology, Vol I, First Ed, 1963; and the recent USA Standard referenced above.

4 The specification of DL is somewhat arbitrary, because the probability of detecting the test target varies between 0 and 1 over a small range of luminances. DL is commonly specified as the luminance increment or difference corresponding to a detection probability of 0.5 (50% frequency-of-seeing).

B. Preadaptation conditions

It is highly desirable that the patient be adapted to the luminance of the background field before commencement of the perimetric test. A longer time period of preadaptation to this field is necessary for lower background luminance levels. It should also be longer if the patient enters the examination chamber from an intensely luminous environment. It is desirable that the manufacturer and examiner determine the light adaptation period which provides relatively stable response for the instrument and conditions used. Preadaptation conditions can also be important when testing individuals manifesting certain types of pa .

C. Diffusely reflecting surface

It is desirable that the background field be a diffusely reflecting surface, ie, a non-glossy surface which at least approximates Lambert's Law.

7. Specification of the location of an Object in the Visual Field

A polar co-ordinate system should be used when defining (a) the half-meridian and (b) the eccentricity of the center of the test target, both expressed in degrees. The zero degree half-meridian is defined to the right of the patient (as seen by the patient). The specified half-meridian then proceeds counterclockwise through 360 degrees about the fixation target (as seen by the patient). The fixation point is defined at having zero degree eccentricity. This assumes the patient has normal fixation.

This system does not allow fine specification of the *area* of a scotoma or of an isopter because of non-linearity of representation,5 except in the case of a hemisphere where proportional solid angles are present. This requires the center of the entrance pupil of the eye to lie at the center of curvature of the hemisphere. In this special case, two equal solid angles located at different loci in the visual field subtend equal areas on the surface of the hemisphere. This condition does not exist if a flat test surface is used for examination of the visual field, e.g., when a tangent screen is employed. The same statement may be applied to the cartographic deformation of the field as expressed on a flat sheet of paper. There exist cartographic projections which attempt to represent areas proportionately.

It is highly desirable to keep the tolerances for location, registration, and replication of test object position within narrow limits. If this cannot be achieved, the reliability of subsequent determinations is limited, especially for static (target not moving) perimetry. Accuracy is limited by the size and nature of the fixation target, the stability of patient fixation, and the mechanical capabilities of the perimetric device.6 In turn, these factors influence the selection of the smallest useful target size.

Optimal fixation targets have not yet been defined. This is an important question which needs clarification through research. Obviously, it is desirable to monitor patient fixation directly. When central vision is impaired, special fixation targets or displays are often needed.

It is desirable that measured test points should be indicated on the test record in an obvious manner. Clearly the more points tested, the better the characterisation of the visual field. The more repetitions of evaluations made at a single point, the greater the reliability of the determination. It is desirable that one or more points be evaluated more than once in order to define the approximate reliability of the test. It is desirable that interpolation or analysis techniques employed be clearly defined

5 Distinguish between ability to specify a location and an area.

6 Lens factors also influence accuracy of location and re-location of a target in the visual field. Apparent location of a target is influenced by power and centration of the lens correction, vertex distance, base curve and lens thickness. It is desirable that the lens(es) used and the vertex distance be noted. There is an advantage in keeping vertex distance small.

8. Target Specification (non-photometric)

A. Size, distance, and form

Ideally target dimensions should be specified in terms of the solid angle subtended at the centre of the :e pupil of the eye and measured in steradians. Practically, this is not done, nor do we recommend such designation as essential at this time.

A conceptually simpler scheme is the specification of the diameter of the target in terms of visual angle subtended at the center of the entrance pupil of the eye. This assumes that a round target is located at the point of fixation. If the target is not round, the diameter of the equivalent round target subtending the same area at the point of fixation may be used. Target diameters should be expressed in degrees, minutes, and seconds of arc. It is highly desirable to specify test target distance from the eye, because luminance is dependent on test distance for perimetric test targets of small dimension. (The same is not true for extended background fields.) Thus, for proper specification, it is highly desirable that both angular subtense and target distance be specified. Other factors, such as image blur resulting from several causes, also make specification of target distance desirable (see below, Image sharpness). As an example of proper specification, a target may subtend 6' of arc (angular diameter) at a 330 millimeter test distance.

Alternatively, specification of the tangent of the angle subtended at the center of the entrance pupil of the eye for a target located at the fixation point has been widely used.

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Fig. 1. $\underline{d/D}$ = 2 tan (/2)

This measure is expressed as a fraction, the diameter (d) of the target in millimeters divided by the distance of the fixation point from the eye (D) in millimeters (e.g. 2 mm white/1000mm). Of the two schemes (the angle subtended plus the test distance versus the tangent fraction) the angle subtended and test distance is the preferred form of representation because it is conceptually simpler to compare angular subtense of targets on two different test instruments. Thus the IPS recommends the specification of equivalent7 test target diameter and distance as follows:

(a) minutes of arc diameter at (b) millimeters test distance. In publications this form is preferred. Other systems may be used if a logical scheme is formulated and if conversion to the above preferred form is provided.

When a tangent screen is used, and targets are displayed from the point of fixation, the angular subtenses, the solid angle subtended by the target, and the effective test distance are all altered. If a projector is used with a tangent screen, its center of projection must effectively be placed as near as possible to the location of the test eye in order to minimize distorting effects and blur. When tangent screens are used (or other perimetric devices) every effort should be made to make background luminance as uniform as possible.

It is desirable that a number of different size targets be available for testing, and that the visual angles subtended by these targets extend from an effective point source to large targets in an orderly series.

It is desirable that the target shape or form used be described. For targets that depart meaningfully from round or near round, it is desirable that orientation be indicated as well as its shape or form.

6 Lens factors also influence accuracy of location and re-location of a target in the visual field. Apparent location of a target is influenced by power and centration of the lens correction, vertex distance, base curve and lens thickness. It is desirable that the len(es) used and the vertex distance be noted. There is an advantage in keeping vertex distance small.

7 The use of equivalence is only valid for targets which approximate round shapes.

B. Contrast

The contrast of the test target against the background field may be represented in various ways, depending upon usage. Let LT = luminance of the test target, and LB = luminance of the background or adapting field,8 then DL is the just detectable change in target luminance, and would be defined as DL = LT - LB at threshold. A contrast may be positive or negative, that is, the target may have a higher luminance than the background (positive contrast) or the darker than the background (negative contrast). All of the following formats have been used to describe contrast = C:

(a1) $C = \frac{LT - LB}{LB}$ (Recommended)

(a2) $C = \frac{LT - LB}{LB}$ 9

(a3) $CT = \frac{DL}{LB}$ CT = contrast at threshold (Recommended)

(b) $C = \frac{LT}{LB}$

(c) $C = \frac{LT - LB}{LT + LB} = \frac{LT - LB}{2 \{(LT + LB) / 2\}}$ where (LT + LB) / 2 = mean luminance

NOTE: In a projection perimeter, DL is the projected incremental field and the luminance at the pointed tested LT = DL + LB. Negative contrast, ie, a darker target against a brighter background, is rarely used in perimetry, but is commonly used in conjunction with visual acuity charts.

DIAGRAM

Fig. 2.

In routine perimetry form a1 or a3 is the recommended usage. For simplicity of design most tests performed use positive contrast. Form c is often used as a description of modulation in contrast sensitivity functions. F is also known as the Weber fraction. As the increment or contrast threshold, form a1 is equivalent to a3. S many forms exist for expression of contrast, it is desirable that the form employed be indicated.

C. Duration of Presentation

1. *Non-moving or static target(s) (here we only consider a single presentation of the test target).* The response of the visual system changes with duration of exposure of a visual stimulus. The exposure time at which this transition occurs is known as the critical duration. The critical duration is about 100 milliseconds, and varies with several factors, including test target locus in the field, target size, background field luminance and pathology.

8 That which follows assumes that LB is greater than zero.

9 |c| symbol denotes absolute value, ie, a value without sign.

For exposures shorter than the critical duration,

DL x Duration of exposure = Constant

while for durations of exposure longer than the critical duration,

DL = Constant

Obviously the latter is a less demanding test situation for calibration as one less parameter needs to be specified in the test instrument. Shorter durations may be advantaged, but adequate calibration capability is advisable.

If the duration of exposure exceeds the latency for a saccadic eye movement (approximately 250 milliseconds), there is a tendency for some patients to avert their eyes from the fixation point to look at the target.

It is desirable that duration of exposure provided by the manufacturer be specified and that some scheme be available to determine whether a mechanical shutter or test flash device is operating properly if the duration of exposure is less than the critical duration.

One must use care when presenting serial stimuli at the same test locus. It is desirable that the prior presentation shall not affect response to the later ones.

2. *Moving or kinetic targets*. If the target or stimulus is moved, as in kinetic perimetry, the most important point is the stability of rate of movement, ie, a fixed angular velocity, initially and at the time of re-examination. Some perimetrists use a different strategy, e.g., a somewhat slower rate of movement, in the central field. In most instances the target is moved from non-seeing to seeing. Other strategies may be used to fit specific needs. In recording and/or reporting results it is desirable (to the extent possible) that test conditions employed be described. Detectability of a moving target is dependent upon test target luminance and/or contrast, area, direction, and rate of movement. The measured results are subject to meaningful variation if such factors are not properly controlled. The specification of optimal test conditions is a complex question requiring further research. Thus, at this time, the IPS does not recommend any single desired rate of movement or test strategy. In so stating, the IPS in no way means to under-estimate the importance of kinetic perimetry.

D. Image sharpness

One of the least appreciated variables in visual field testing is the blur of the retinal image of the test target. Many factors affect image blur. Appropriate optical correction to the test distance is needed especially fo test targets. This correction will vary with presbyopia, the use of miotics, cycloplegics, and in the preser many forms of pathology, etc.

9. Color Perimetry

When reporting data, it is highly desirable to specify the observer's task, whether it be just detection or a judgement of hue and saturation of the target.

In colour perimetry we recommend that both target and background field radiance and luminance be specified at the center of the entrance pupil of the eye. In anticipation of the development of new colour perimetric tests, the IPS recommends a general increase in background and target luminance levels; spectral specification in the plane of the entrance pupil of light sources and stimuli (including the properties of filters); and, if possible, designation of CIE co-ordinates of the same elements.10 Further, definition of colour temperature of the source and a logical scheme for replacement of aged light sources has been recommended above. For colour testing it is preferable to use nearly monochromatic stimuli as this greatly simplifies calibration requirements. Similarly (and particularly when non-monochromatic light stimuli are used) the use of light sources which emit continuous spectra simplifies analysis of stimuli.

10. Other Factors

A. Attention signal and shutter noise

In many applications of perimetry it is useful to provide a signal or cue to indicate that a stimulus is about to be presented. Such cues are often auditory. This clearly influences the probability of response and in certain situations may be more effective. Similarly, for long duration stimuli, the noise of an activated shutter can serve the same purpose.

B. Distractions to be avoided

It is recommended that the perimeter be placed in a quiet room where light conditions can be completely controlled, and distractions can be avoided.

C. Relative and absolute scotomas

It is important to differentiate between relative and absolute scotomas. A relative scotomas is defined as a partial visual deficit in a given area of visual field. An absolute scotoma implies total loss of vision in a given field area. Practically, absolute scotomas are usually defined in terms of the largest, most intense target available to the perimetrist. In fact, some response may yet remain and may have been revealed if still larger or more intense targets had been used (assuming stray light effects have been considered). Thus, it is desirable, in discussions of absolute scotomas, to specify the largest and most intense stimulus employed.

11. Acceptance and Revision of these Standards

a. The proposed standards have been approved by the R.G. on Standards and the Board of the IPS.

b. These Standards, once approved, will remain in force until revised by the R.G. on Standards of the IPS. These Standards must be reviewed every four years and either reaffirmed, modified, or replaced.

c. The R.G. on Standards stands ready to provide reasonable advice, and to offer clarification relative to matters contained in this set of standards. All correspondence relative to such matters and suggested improvem should be directed to the Secretary of the IPS.

10 It should be recognized that CIE coordinates as specified for central vision may not be valid for peripheral field test points.

IPS *English*

A0 **Stimulation**

A1 Inadequate stimulus

A2 Adequate stimulus

A3 Distal stimulus

A4 Proximal stimulus

A5 Threshold stimulus

A6 Subthreshold stimulus

A7 Suprathreshold stimulus

A8 Radiation

A9 Complex radiation

A10 Monochromatic radiation

A11 Wavelength - l

A12 Nanometer - nm

A13 Spectral distribution

A14 Colour (or)

A15 Colour (or) temperature

A16 Kelvin - K

A17 Dominant wavelength - ld

A18 Excitation purity *pe*

A19 Chromaticity coordinates - x, y; x10, y10

A20 Standard illuminant - A, B, C, D65

A21 Complementary colour (or)s

A22 Radiance - *Le*

A23 Watt per steradian per square metre (er) - W.sr-1 .m-2

A24 Luminance - *L*

A25 Candela per square metre (er) - cd.m-2

A26 Irradiance - *E*e

A27 Watt per square metre (er) - W.m-2

A28 Illuminance - E

A29 Lux - lx

A30 Reflection

A31 Specular reflection

A32 Diffuse reflection

A33 Uniform diffuse reflection

A34 Mixed reflection

A35 Regular reflectance - *p*r

A36 Diffuse reflectance - *p*d

A37 Gloss

A38 Transmission

A39 Regular transmission

A40 Diffuse transmission

A41 Uniform diffuse transmission

A42 Mixed transmission

A43 Regular transmittance - tr

A44 Diffuse transmittance - tr

A45 Absorption

A46 Absorptance - a

A47 Optical density - *D*

A48 Diffusion

A49 Refraction

A50 Dispersion

A51 Diffraction

A52 Polarized light

A53 Unpolarized light

A54 Coherent light

A55 Incoherent light

A56 Temporal modulation

A57 Intermittent stimulation

A58 Pulsed stimulation

A59 Periodic pulsed stimulation

A60 Period

A61 Frequency - v

A62 Hertz - Hz

A63 Duty cycle, light dark ratio

A64 Sinusoidally varying stimulation

A65 Modulation depth

A66 Spatial modulation

A67 Modulation transfer function - MTF

A68 Interferometric resolution

A69 Object, target (=O)

A70 Background (=Bd)

A71 Surround (=Sd)

A72 (O, Bd, Sd) shape

A73 round

A74 elliptical

A75 square

A76 (O, Bd, Sd) contour

A77 Edge gradient

A78 (O, Bd, Sd) distance -*l*

A79 (O, Bd, Sd) diameter -*d*

A80 Millimetre (er) - mm

A81 (O, Bd, Sd) visual angle - *q*

A82 Minute of arc - '

A83 Second of arc - "

A84 (O, Bd,Sd) area -*S*

A85 Square millimetre (er) -mm2

A86 (O, Bd, Sd) solid angle - w

A87 Steradian -sr

A88 (O, Bd, Sd) luminance - *L*

A89 Decibel - dB

A90 (O) intensity - *I*

A91 Candela - cd

A92 (O, Bd, Sd) colour (or)

A93 red

A94 orange

A95 yellow

A96 green

A97 blue

A98 violet

A100 white

A101 grey

A102 black

A103 (O, Bd, Sd) Munsell notation

A104 (O, Bd, Sd) exposure duration - *t*

A105 Second of time -s

A106 (O) angular velocity

A107 Degree per second

A108 Rate of increase of (O, Bd, Sd) luminance

A109 (Photometric) luminance contrast - *C* = D*L*/*L*

A110 Corneal illuminance -*E*cor

A111 Luminance measured from the position of the centre (er) of the entrance pupil - *L*pup

A112 Pupil diameter -*d* pup

A113 Pupil area - *S* pup

A114 Retinal illuminance - *E*ret

A115 Troland - td

A116 Reduced troland - tdr

A117 Blur of the retinal image

A118 Intraocular stray light

A119 Equivalent veiling luminance

B0 **Perception**

B1 Brightness

B2 Lightness

B3 Hue

B4 Saturation

B5 Chromaticity

B6 Bezold-Brucke phenomenon

B7 Flicker

B8 Stroboscopic effect

B9 Speed of perception

B10 Subjective colour (or)s

B11 Fusion frequency - FF

B12 Local adaptation

B13 Discomfort glare

B14 Disability glare

B15 Adaptation

B16 Photopic vision

B17 Mesopic vision

B18 Scotopic vision

B19 Adaptation curve

B20 Break (in adaptation curve)

B21 Chromatic adaptation

B22 Threshold

B23 Sensitivity

B24 Absolute threshold

B25 Absolute sensitivity

B26 Difference (or increment) threshold - D*L*

B27 Difference (or increment) sensitivity - 1/D*L*

B28 Perceived contrast

B29 Luminosity contrast

B30 Colour (or) contrast

B31 Simultaneous contrast

B32 Successive contrast

B33 Contrast threshold (=Weber fraction) - D*L/L*

B34 Contrast sensitivity *L/DL*

B35 Modulation threshold - D*L/S*(*L*1 + *L*2)

B36 Liminal brightness increment (UK) - Just noticeable difference (US)- j.n.d.

B37 Visual resolution

B38 Visual acuity

B39 Stereoscopic visual acuity

B40 Kinetic (=dynamic) visual acuity

B41 Achromatic threshold

B42 Chromatic threshold

B43 Photochromatic interval

B44 Spatial summation

B45 Successive lateral spatial summation

B46 Receptive field

B47 Temporal summation

B48 Summation exponent

B49 Summation number

B50 Critical duration

B51 Inhibition

B52 Sensitization

B53 Sustained-type visual response

B54 Westheimer function

B55 Transient-type visual response

B56 Rivalry in the visual field

B57 Binocular rivalry

B58 Spectral relative luminous efficiency function - *V*(l)

B59 Purkinje phenomenon

B60 Stiles' p function

B61 Directional sensitivity function (= Stiles-Crawford effect)

B62 Entoptic phenomenon

B63 Maxwell's spot

B64 Haidinger's brushes

B65 Directional selectivity

B66 Reaction time

B67 Optokinetic nystagmus

B68 Attention

B69 Breadth of attention

B70 Expectancy

B71 Conspicuousness

B72 Distraction

B73 Fatigue

B74 Mental processing block

B75 Visual performance

C0 **Technique**

C1 Psycho-physical method

C2 Perimetry

C3 Campimetry

C4 Screening method

C5 Confrontation test

C6 Scotometer

C7 Plate for evaluating scotomas

C8 Tangent screen

C9 Angioscotometer

C10 Perimetric arc

C11 Portable hand perimeter

C12 Hemispheric (=cupola, = bowl) perimeter

C13 Projection perimeter

C14 Monocular perimetry

C15 Binocular perimetry with fusional stimulus

C16 Participation binocular perimetry

C17 Phase difference haploscopy

C18 Measurement of peripheral visual acuity

C19 Werblin's rotating windmill pattern

C20 Colour (or) perimetry

C21 Flicker perimetry

C22 Photopic perimetry

C23 Mesopic perimetry

C24 Scotopic perimetry

C25 Adaptoperimetry

C26 Temporal adaptoperimetry

C27 Steady-state adaptoperimetry

C28 Fundus image-controlled perimetry

C29 Combined method (=check-up)

C30 Subjective method

C31 Entoptic method

C32 Objective method

C33 Pupillomotor perimetry

C34 Optokinetic perimetry

C35 ERG (=electroretinographic) perimetry

C36 VER (= visual evoked response) perimetry

C37 EEG (= electroencephalographic) perimetry

C38 Light source

C39 Daylight#

C40 Incandescent lamp

C41 Projector lamp

C42 Halogen lamp

C43 Fluorescent lamp

C44 Electronic flash tube

C45 Light emitting diode

C46 Arc lamp

C47 Xenon arc

C48 Laser

C49 Point-source

C50 prefocussed

C51 clear

C52 frosted

C53 Filament

C54 Vacillation

C55 Ageing

C56 Life of a lamp

C57 Light housing

C58 Reflector

C59 Cut-off

C60 Projector

C61 Dimmer

C62 Shutter

C63 Screen

C64 Diaphragm

C65 Ground glass

C66 Opal glass

C67 Mirror

C68 Semitransparent mirror

C69 Neutral density filter

C70 Neutral density wedge

C71 Neutral step density filter

C72 Luminance scale

C73 Luminance step

C74 Colour(or) filter

C75 Complementary filter

C76 Interference filter

C77 Heat absorbing filter

C78 Polarizing filter

C79 Nicol prism

C80 Polaroid

C81 transparent

C82 translucent

C83 opaque

C84 Projection obliquity

C85 Zoom magnification system

C86 Calibration

C87 Photometric control

C88 Radiometer

C89 Spectroradiometer

C90 Photometer

C91 Spectrophotometer

C92 Photocell

C93 Photomultiplier

C94 Luminance meter

C95 Luxmeter

C96 Standard of light

C97 Comparison surface

C98 Discolouration (UK), discoloration (US)

C99 Yellowing

C100 Smudging

C101 Ametropia

C102 Empty field myopia

C103 Night myopia

C104 Instrument myopia

C105 Presbyopia

C106 Cycloplegia

C107 Resting point of accommodation

C108 Optical correction

C109 Spectacles

C110 Correction lens

C111 Correction lens holder

C112 Tinted lens

C113 Contact lens (hard, soft, flexible, corneal, scleral)

C114 Eikonic lens

C115 Achromatizing lens

C116 Blinking

C117 Natural pupil

C118 Pupillometer

C119 Artificial pupil

C120 Maxwellian view

C121 Stabilized retinal image

C122 Chin rest

C123 Forehead rest

C124 Dental bite bar

C125 Occluder

C126 Fixation device

C127 Fixation control

C128 Infrared image converter

C129 Visual fixation control

C130 Electronic fixed monitor

C131 Isopter perimetry

C132 Profile perimetry

C133 Meridional perimetry

C134 Circular perimetry

C135 Kinetic perimetry

C136 centripetal

C137 centrifugal

C138 clockwise

C139 anticlockwise (UK), counter-clockwise (US)

C140 Rate of movement

C141 Automatic object translation

C142 Static perimetry

C143 Single stimulus

C144 Multiple stimuli

C145 Multiple pattern

C146 Frequency of presentation

C147 Flash

C148 Tachistoscopic presentation

C149 Kinetic-static perimetry

C150 Perimetrist

C151 Subject (=observer, =patient)

C152 experienced

C153 inexperienced

C154 Ascending method of limits

C155 Descending method of limits

C156 Frequency-of-seeing curve

C157 Forced binary choice

C158 Forced multiple choice

C159 Subject's response criterion

C160 Judgement time

C161 (Degree of) Coopration of the subject

C162 Motivation

C163 Reaction time

C164 Chronometer

C165 Test period

C166 Rest period

C167 Accommodation

C168 Relaxation of accommodation

C169 Spiral shaped pattern

C170 Star shaped pattern

C171 Repeat static test

C172 Extinction phenomenon

C173 False positive response

C174 False negative response

C175 Delayed response

C176 Signal device

C177 Verbal response

C178 Manual response

C179 Push-button

C180 Buzzer

C181 Manual recording

C182 Semi-automatic recording

C183 Computerised perimetry

C184 Automation

C185 Programme (UK), Program (US)

C186 Computerised perimetry

C187 Chart

C188 Chart scale

C189 Polygonal connection (of isopter)

C190 Fluent fitting (of isopter) by eye

C191 Cartographic deformation

C192 Polar azimuthal equidistant projection

C193 Central tangential projection

C194 Parabolic projection

C195 Equivalent projections

C196 Conformal projections

C197 To hatch

C198 Interpretation of a visual field chart

C199 Area of a field defect

C200 Density of a field defect

C201 Protocol

C202 Control examination

C203 Follow-up

C204 Data bank

D0 Normal Visual Field

D1 Ergoramic occupational visual field

D2 Panoramic occupational visual field

D3 Total dynamic field

D4 Fixation point

D5 Meridian

D6 Parallel circle

D7 Central field

D8 Midzone

D9 Periphery

D10 Hemifield

D11 Quadrant

D12 temporal

D13 nasal

D14 superior

D15 inferior

D16 supero-temporal, etc

D17 Eccentricity

D18 Absolute limits

D19 Profile

D20 Isopter

D21 Central peak

D22 Peripheral limits

D23 Blind spot

D24 Angioscotoma

D25 Vertical symmetry of the isopters

D26 Central scotoma at low light levels

D27 Hemiopic border

D28 Horizontal raphe

D29 Refractive scotoma

D30 Rotation of the blind spot

E0 Pathology

E1 Defect

E2 Absolute defect

E3 Relative defect

E4 Chromatic defect

E5 Gradient

E6 Steep slope

E7 Gradual (=gentle) slope

E8 Notch

E9 Peripheral defect

E10 Contraction

E11 Concentric contraction

E12 Generalized concentric contraction

E13 Scotoma

E14 Positive scotoma

E15 Negative scotoma

E16 Depression of the sensitivity curve

E17 Central scotoma

E18 Eccentric fixation

E19 Eccentric viewing

E20 Displacement of the blind spot

E21 Macular scotoma

E22 Scotoma caused by inhibition

E23 Paracentral scotoma

E24 Pericentral scotoma

E25 Paracaecal scotoma

E26 Pericaecal scotoma (=enlargement of the blind spot)

E27 Baring of the blind spot

E28 Centrocaecal scotoma

E29 Ring scotoma

E30 Zonular scotoma

E31 Nerve fibre(er)s bundle defect (=NFBD)

E32 Central NFBD

E33 Juxta-papillary NFBD

E34 Arcuate NFBD (=Bjerrum scotoma)

E35 A NFBD in a nasal quadrant

E36 A NFBD in a temporal quadrant

E37 Cuneate NFBD

E38 NFBD proceeding away from the blind spot

E39 NFBD proceeding towards the blind spot

E40 Break through

E41 Swiss cheese defect, Sieve-like defect

E42 Defect of vascular origin

E43 Neuroscotoma

E44 Hemianopia

E45 hemianopic

E46 Hemidysopia (=relative hemianopia)

E47 Hemiachromatopsia

E48 Quadrantanopia

E49 quadrantic

E50 Quadrant dysopia (=relative quadrantanopia)

E51 heteronymous

E52 bitemporal

E53 binasal

E54 homonymous

E55 left

E56 right

E57 vertical

E58 horizontal

E59 crossed

E60 Step (nasal etc)

E61 hemianopic central scotoma (heteronymous-, etc)

E62 Quadrantanopic central scotoma (id)

E63 Symmetrical defect

E64 Asymmetrical defect

E65 Congruent defect

E66 Incongruent defect

E67 Temporal crescent

E68 Overshot

E69 Sparing of the macula

E70 Splitting of the macula

E71 Agnosia

E72 Cortical blindness

E73 Handicap

E74 Degree of disability

E75 one-eyed

E76 Esterman grid

E77 Enlargement of a field defect

E78 Diminution of a field defect

E79 Disappearance of a field defect

E80 Malingering (or simulation) of a field defect

E81 Hysterical field defect

E82 Concealment of a field defect