Nearpoint Rotochart

User’s Guide



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Introduction

The Nearpoint Rotochart consists of 12 different targets with symbols for practically all near point tests. Contained are essential features of the best clinically accepted near point cards, with modifications suggested by research and clinical studies.

The symbols for a specific test may be exposed in the aperture without interference by other test symbols. This eliminates distraction and reduces the influence of other undesirable factors, such as peripheral fusion. For the same reason the size of the Rotochart is such as to provide a uniform background that screens out objects beyond the chart.

The Nearpoint Rotochart is made of plastic and can be easily cleaned with a damp cloth. Keeping the Rotochart clean is important because any soiling of the test card can reduce contrast and possibly introduce fusional stimuli, which may affect the phoria and fusional findings. The low specular reflectance of the Rotochart prevents glare and the formation of reflected images of the Reichert Phoroptor® Refracting Instrument, trial frame or other objects in the test area. The illumination of the Nearpoint Rotochart should be between 10 to 20 foot-candles, and the light should be diffused and evenly distributed.

Description of Test Charts

FRONT

Target No.

1. Reading Material (20/60 to 20/20)
2. Reduced Snellen Letters (20/50 to 20/20)
3. Cross Cylinder Grid (Fine Lines)
4. Horizontal Line of Words
5. Single Row of 20/20 Letters
6. Nearpoint of Astigmatic Chart

REVERSE

Target No.

7. Reading Material (20/200 to 20/80)
8. Reduced Snellen Letters (20/200 to 20/60)
9. Trifocal Chart
10. Vertical Line of Words
11. Seven Rows of 20/20 Letters
12. Cross Cylinder Grid (Heavy Lines)

Note: For the purpose of reproducing this manual, fonts may be slightly different, but the text is reflective of the information on the Rotochart.

Charts

Reading Material

Target 1 - Reading Material (20/60 to 20/20)
Target 7 - Reading Material (20/200 to 20/80)

For a reading distance of 16 inches, the visual angles subtended by the lower case letters correspond to those of the indicated Snellen notation.

The sentences have been selected from Johanna Spyri's classic "Heidi" and are considered easily readable and non-emotional.

The larger size material on Target No. 7 may be used for subnormal vision patients or uncorrected ametropes.

It is generally known that words forming a sensible sentence are not an accurate measure of visual acuity. Nevertheless, many refractionists, in determining the patient's near point correction, prefer sentences to individual Snellen letters, since sentences more nearly correspond to the purpose of which the near correction is to be used.

If the test is made at 16 inches, it must be realized that not all patients read at 16 inches. Reading distance is a highly individual matter, influenced by such factors as habit, length of arms, occupation, illumination, letter size and contrast.

However, once the addition has been determined for 16 inches, the addition needed for any other visual distance can be readily obtained by noting the dioptric difference between this distance and 16 inches. For example, 20 inches require 0.50D less; 26 inches requires 1.00D less; 13 inches requires 0.50D more; 11 ½ inches requires 1.00D more; 10 inches requires 1.50D more, etc. For subjective verification of the addition, the reading card may be set at the patient's preferred reading distance.



Figure CC-01 Target 1

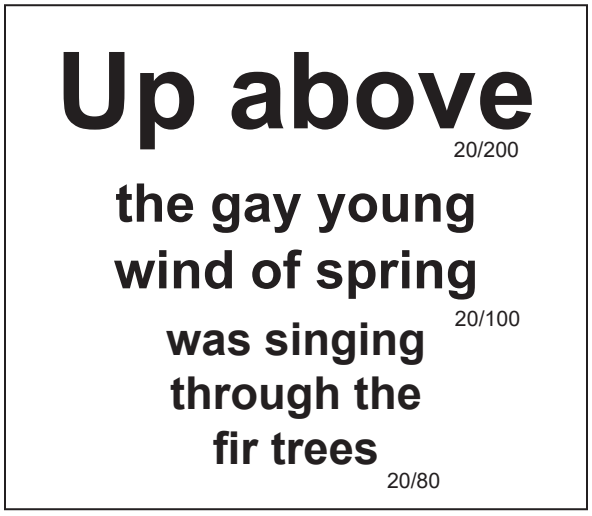

Figure CC-02 Target 7

Charts (continued)

Reduced Snellen Letters

Target 2 - Reduced Snellen Letters (20/50 to 20/20)
Target 8 - Reduced Snellen Letters (20/200 to 20/60)

The letters of these targets may be used for an accurate measure of the patient's near point visual acuity, with or without refractive correction.

The size and the shape of the letters conform to the Snellen principle, and the notations apply to a test at a distance of 16 inches. There are eleven carefully selected letters used throughout the charts. The letter "E" is included because of clinical precedent, and the remaining ten letters are deemed of nearly equal average legibility.

Various notations (Jaeger, Snellen, meter, decimal notation, visual angle, visual efficiency, etc.) are used for near visual acuity. The physiological function of visual acuity and the method of measuring is the same regardless of test distance or notation. The choice of a unit for specifying the results of an acuity test is chiefly a matter of convenience, since conversion from one unit to another is a simple matter.

A convenient table, comparing the various notations, is provided on the back page.



Figure CC-03 Target 2



Figure CC-04 Target 8

Cross Cylinder Grid

Target 3 - Cross Cylinder Grid - (Fine Lines)
Target 12 - Cross Cylinder Grid - (Heavy Lines)

These targets are used in the Dynamic Cross Cylinder Test which determines the conjugate foci at the near point. Since clinicians may prefer a grid of fine lines or heavy lines, both line types are provided.

The Dynamic Cross Cylinder Test is usually made as follows: The grid is presented at 16 inches (or any other distance) and the 0.50D cross cylinders, minus axis at 90°, are placed before the patient's eyes. If the patient accommodates exactly for the target distance, the horizontal and vertical lines appear equally cleared or blurred. If the patient over-accommodates, only the vertical lines appear clear. Usually, the patient under-accommodates with the result that the horizontal lines appear clearer. If so, plus spheres of gradually increasing powers are added until the vertical lines appear clearer; then the spherical power is reduced until the lines appear equally clear. When this has been finished, first monocularly, then binocularly, the difference between the total lens power before the eyes and the distance correction represents the "add" for the particular test distance. The binocular test normally yields a slightly lower add than the monocular test.

The Grid may be used in conjunction with cross cylinders as a test for accommodation.

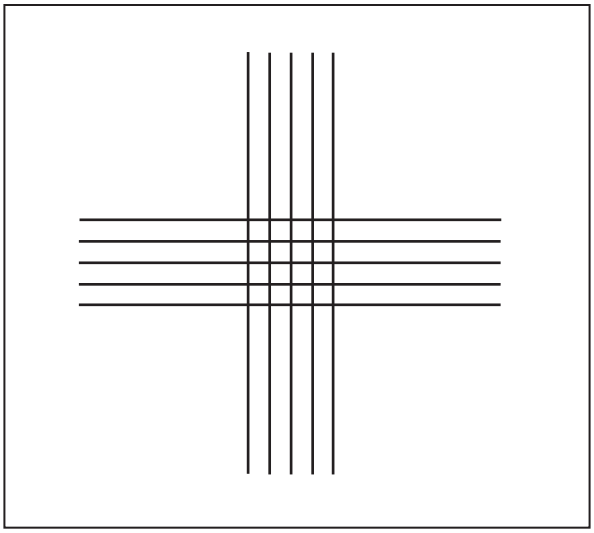

Figure CC-05 Target 3

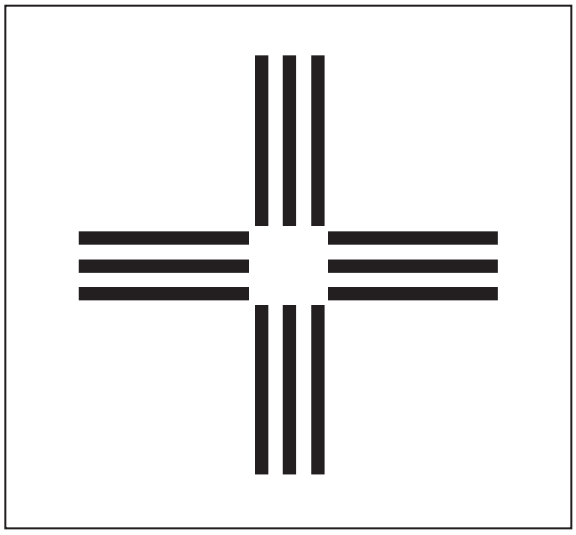

Figure CC-06 Target 12

Charts (continued)

Word Lines

Target 4 - Horizontal Line of Words
Target 10 - Vertical Line of Words

Target No. 4 is used in measuring the lateral phoria at near. The uniocular images are dissociated by means of vertical prisms and the double images are aligned by using lateral prismatic power of the Rotary Prisms. This target is also used with vertical prismatic power of the Rotary Prisms in the measurement of the vertical fusional amplitudes.

Target No. 10 may be used in measuring the vertical phoria at near. The uniocular images are dissociated by means of Base-In prismatic power, and the double images are aligned by using vertical prismatic power of the Rotary Prisms. Target No. 10 may also be used with lateral prismatic power of the Rotary Prisms in the measurement of the lateral fusional amplitudes.

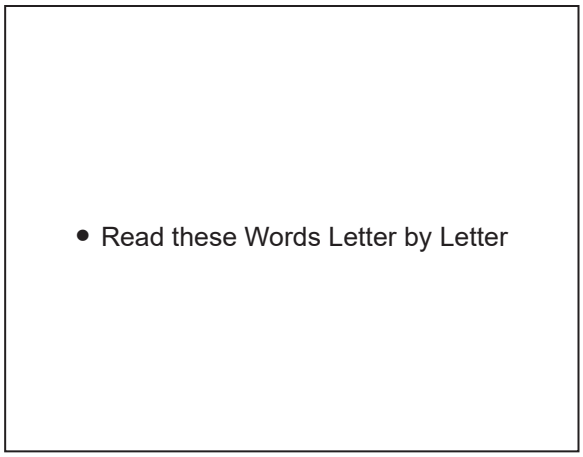

Figure CC-07 Target 4

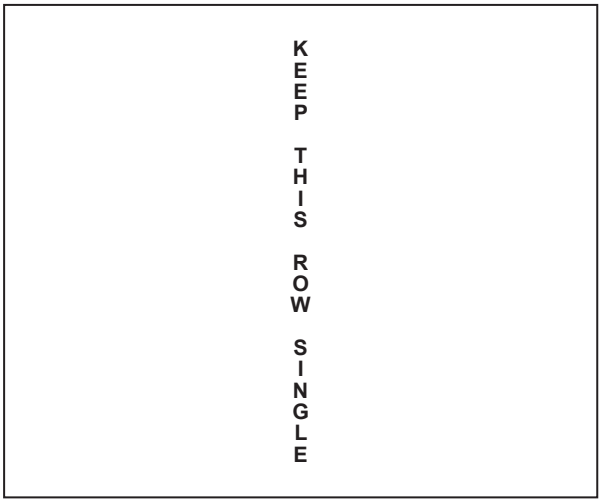

Figure CC-08 Target 10

Trifocal Chart

Target 9 - Trifocal Chart

Target No. 9 provides letters of varying sizes in accordance with the Snellen principle for the visual distance of 28 inches. It, therefore, may be used in determining the range of intermediate (or arm's length) vision, and the need for trifocal lenses.

After the add for the usual reading distance has been determined, this target is used at 28 inches to demonstrate and determine the visual acuity at this intermediate distance. When the reading add is +1.50D or more, the target at 28 inches may be blurred. Normally, trifocal segments with powers of 50% of the reading add will provide clear vision in the intermediate range.

Furthermore, Target No. 9 placed at 14 inches may be used for subnormal vision patients. Since the visual angle is doubled at this distance, the Snellen notation must be changed accordingly so that, for instance, 20/200 becomes 20/400, and 20/20 becomes 20/40.

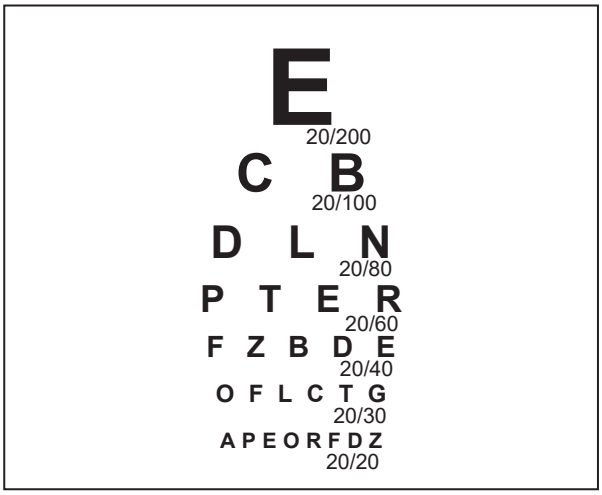

Figure CC-09 Target 9

20/20 Letters

Target 5 - Single Row of 20/20 Letters
Target 11 - Seven Rows of 20/20 Letters

These letters, which represent the 20/20 equivalent for 16 inches, will be found useful by refractionists who prefer smaller letters than those of Targets No. 4 and 10 for the measurement of near point phorias and fusional amplitudes.

These letters may also be used in determining the Amplitude of Accommodation as well as the monocular and binocular ranges of clear near vision through various corrections.



Figure CC-10 Target 5

Nearpoint Astigmatic Chart

Target 6 - Nearpoint Astigmatic Chart

Practically all visual functions are measured at distance and then at near. The Near Point Astigmatic Chart is similar to that used for distance.

The fogging technique used in the measurement of astigmatism at distance should also be used at near. That is, the spherical power should be adjusted so that the Conoid of Sturm is anterior to the retina. The findings of the Dynamic Cross Cylinder Test provide a good clue to the spherical power which slightly overcorrects the more hyperopic principle meridian. Once the proper fogging sphere has been found, the center of the clearest group of lines on the Astigmatic Chart is determined and minus cylinder power, with axis 90° removed from the center of the clearest lines, is added until all lines appear equally clear.

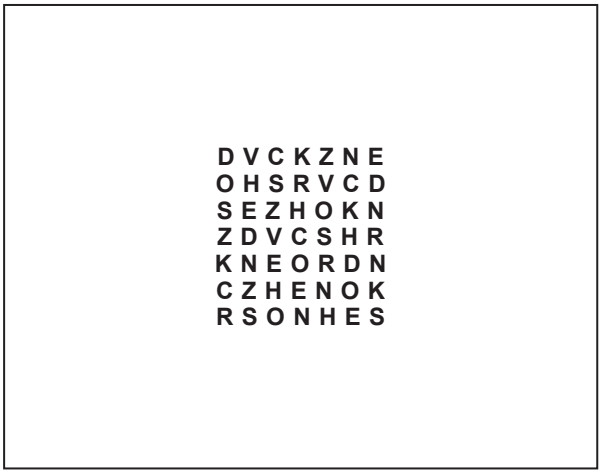

Figure CC-11 Target 11

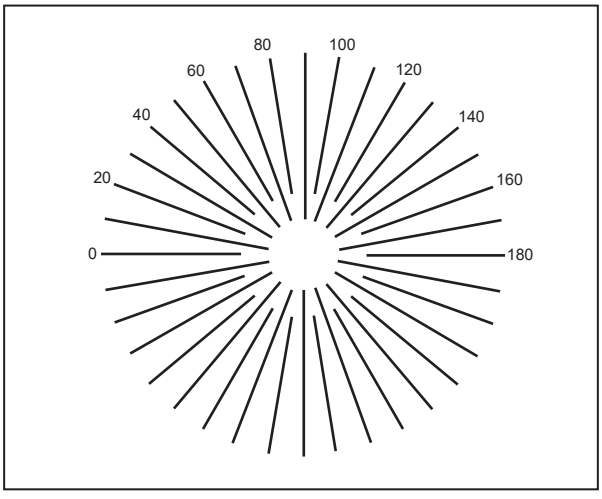

Figure CC-12 Target 6

Charts (continued)

TABLE OF EQUIVALENT VISUAL ACUITY NOTATIONS FOR NEARPOINT ROTOCHART

Visual Angle (Minutes of Arc)	Snellen Equivalent	A.M. A. Notation	Decimal Notation	Jaeger Notation (1)	Meter Notation (2)	Percent Central Visual Efficiency For Near (3)
5’	20/20	14/14	1.00	J1	0.37M	100
6.25’	20/25	14/17	0.80	J1–	0.43	100
7.5’	20/30	14/21	0.66	J2	0.50	95
10’	20/40	14/28	0.50	J4	0.75	90
12.5’	20/50	14/35	0.40	J6	0.87	50
15’	20/60	14/42	0.33	J8	1.00	40
20’	20/80	14/56	0.25	J10	1.50	20
25’	20/100	14/70	0.20	J11	1.75	15
50’	20/200	14/140	0.10	J17	3.50	2

1. Type sizes used in successive editions of Jaeger test cards have not been constant. They were not duplicated in the early Vienna editions of 1857, 1860 and 1865; and the New York series of 1868 showed still further variations. The size of Jaeger letters used here is taken from: Black, N.M., Gradle, N.S., Patterson, J., Snell, A.C. “Report of the Committee for Eye Injuries,” Trans. Sec. Ophth., A.M.A. p. 370, 1927; p. 365, 1932; p. 311-313, 1933.
2. It is also recognized that it is usually easier to read words printed in Jaeger type than individual Snellen letters of the same size. For this reason, a direct comparison between Jaeger and Snellen acuity cannot be made accurately. Nevertheless, in regard to angular size of letters, the above table is adequate for clinical purposes.
3. The “M” stands for “meter.” The reading cards originally designed by Snellen (1862) presented type sizes subtending an angle of 5’ at the given metric distances. “D” has been used on some cards instead of “M.” It was intended to mean “Distance in meters” but has sometimes been erroneously interpreted as “Diopter.”
4. These figures were revised and subsequently approved and accepted by the Executive Committee of the Sect. on Ophth., A.M.A., June 1955. It should be noted that these revised figures weigh near visual acuity disability more heavily than the 1940 A.M.A. table. (Special Reports. Estimation of Loss of Visual Efficiency. Arc. Ophth., 54 (3): 462-468, September 1955).

Notes

Notes (continued)

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