

Instruction Manual

Vision Screening with the VS-V Standard Vision Screener

Model #1155




Keystone View
Excellence in Vision Testing
www.keystoneview.com

DIVISION OF MAST CONCEPTS, INC.

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IMPORTANT NOTICE: The instrument is held closed by a magnetic latch. To free the latch, place thumbs on top edge of base and press up on bottom of chassis (see illustration).

DO NOT lift up on black eyeshield assembly.

Introduction

The VS-V: Features And Capabilities

The VS-V blends technological convenience with more than 80 years of vision testing research, expertise and excellence.

Like its predecessors, the VS-V features several unique competitive advantages such as testing in reflected light rather than with backlit targets to mirror everyday visual function.

The test procedure is simple: The subject sits or stands before the testing instrument with the head in the headrest to view target slides and lamps. The examiner controls the entire procedure through the hand control or Keystone View Software. The examiner explains the targets, prompted by easy-to-follow instructions, and the subject reports what they see. Responses are recorded on an included record form or via the software.

The test series normally takes only 3-5 minutes and incorporates 18 tests that screen 10 vision functions:

- **Binocular testing.** In order to replicate everyday natural visual function, all tests are given with both eyes open, even tests checking acuity in each eye separately.
- **Suppression.** The VS-V is able to disclose whether a subject has blocked vision in either eye – something a standard wall chart test cannot diagnose.
- **Far-point acuity.** For testing vision at far point, the VS-V replicates an actual distance of 20 feet by using a unique bifocal lens system. The system conserves space with this compact, versatile instrument.
- **Near-point acuity.** To test vision at “reading distance”, the VS-V replicates an actual distance of 16 inches.
- **Intermediate-point acuity.** Two intermediate-distance tests at 26 inches and 39 inches use a supplemental lens system easily operated through the hand control. The 26-inch test provides valuable information relative to vision fatigue in heavy computer users while the 39-inch test is useful for persons who use control panels and operate machinery.
- **Phoria.** Special stereoscopic test targets and prism diopters are used to gauge whether a subject’s eyes are balanced to work together with comfort and efficiency.
- **Stereopsis.** The VS-V incorporates a 3-D target to measure depth perception.
- **Fusion.** Simple images test a subject’s ability to merge two images into one clear, coherent joined image.
- **Color perception.** The VS-V tests for both severe (red/green) and mild (blue/violet) deficiencies in color perception.
- **Horizontal peripheral visual field.** This test quickly identifies “tunnel vision” – restrictions of the peripheral vision field. The VS-V incorporates miniature lamp (LED) targets located between the lenses and at the side. Temple areas of the viewing head show how far to the side a subject’s visual field extends when the subject looks straight ahead.

Low light/night vision. The Keystone View VS-V can be adapted to recreate the low lighting conditions experienced in night driving. Results have the same high level of accuracy as VS-V tests that replicate daytime light conditions. Test results should not be significantly different from those obtained under normal light conditions.

All testing—monocular as well as binocular — is done with both eyes open and seeing. This insures the rapid detection of problems such as suppression (the mental blocking out of the image perceived by one of the eyes). Problems of this type would escape conventional wall chart techniques. However, the VS-V incorporates a means of occluding either eye, should this be desired. All Keystone View tests are scientifically correct and psychologically sound.

Instrument Guide

The VS-V is designed for standardized and confidential testing. Targets are enclosed in the unit so subjects cannot see or study them in advance. Internal target illumination ensures consistency of operating conditions, and the unit pivots through a 63-degree arc to adjust to the eye level of any subject.

Only 10 inches wide, 15 ½ inches long and 7 inches tall, the VS-V is compact and completely self-contained; easily sharing a desk or table space with a desktop personal computer. When not in use, a magnetic catch holds the unit closed. The total weight is less than 11 pounds. The VS-V operates from a standard or 220 volt a.c. power outlet.



1. **Control unit:** The VS-V places test operations under push-button command with the Elliptech Soft-Touch hand control.
2. **Unique lens system:** The automated lens system allows the examiner to easily change between far, near and intermediate distances with simple pushes of the button.
3. **Periometer test:** Horizontal peripheral vision fields are measured using light-emitting diode target lamps, positioned between the lenses and recessed in the temple areas of the viewing head so eyeglass frames will not interfere with testing.
4. **Headrest:** Accommodates a wide variety of eyeglass frames. During testing the subject's forehead should rest lightly against this specially-designed strip.
5. **Power switch:** The on/off control at the rear of the instrument.
6. **Transformer:** To eliminate electrical and heat hazards, power for the VS-V is converted to 12 volts DC. To ensure safe operation of the equipment, the VS-V must only be used with the transformer supplied by the manufacturer. Use of any other transformer not ap-

proved by the manufacturer could result in safety problems.

Part No. 980121003

INPUT: 220V AC-50Hz

OUTPUT: 12V DC-3/4 A

The Class II symbol on the transformer label indicates that the transformer does not only rely on basic insulation to protect against electric shock, but has double insulation as an additional safety precaution.

Recommended Environment

Operating temperature: 32 to 104°F

Storage temperature: -4 to 158°F



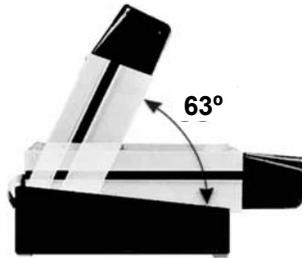
Type B Device



In accordance with Directive 93/42/EEC



Target drum and illumination lamps are readily accessible by removing the top cover of the case. The drum contains eight permanently-mounted stereoscopic tests.



The Keystone VS-V adjusts effortlessly to the eye level of any test subject. It pivots through a 63° arc with free floating action fully controlled by the subject. When not in use, a magnetic catch holds the unit closed.

A convenient storage area, accessible from the rear, is built into the base of the instrument. The instruction manual and extra record forms may be stored here when the Keystone VS-V is not in use.

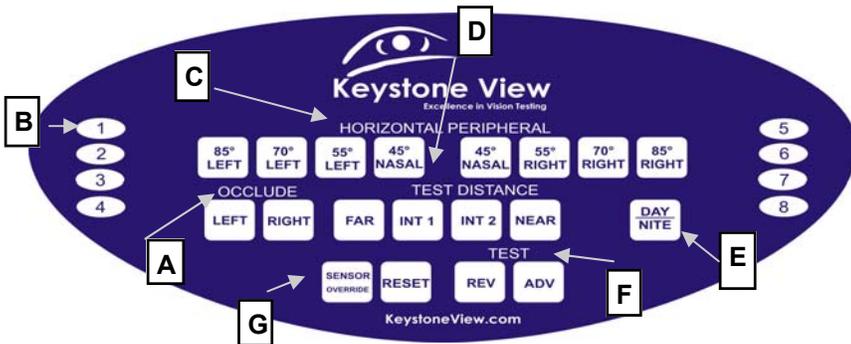
Accessible on the rear panel of the Keystone VS-V are:

- The main power switch “on/off”.
- USB connection port.
- Main power receptacle.

Elliptech Hand Control Unit

The Keystone VS-V Elliptech Soft-Touch hand control unit makes for easy hand operation of the vision screener. The comfortable design makes it suitable for hand-held or desktop operation. The hand control can not be used simultaneously with the Keystone View Visionary Software. By pressing the appropriate buttons on this compact panel you can:

- Advance or reverse stereo tests
- Select near, far, or intermediate distances
- Occlude either of the subject’s eyes
- Selectively light the peripheral vision test lamps
- Perform night-vision tests



Elliptech Hand Control Test Names

- | | |
|-----------------------------|-----------|
| 1. Acuity Right | 5. Phoria |
| 2. Acuity Left | 6. Fusion |
| 3. Acuity Both | 7. Depth |
| 4. Acuity Both Night/Intern | 8. Color |

- A) Occlusion is the process of blocking out one of the eyes in order to test the other. This is done by pushing the button for the eye to be occluded, e.g. occlude the left eye by pushing the left occlude button. The chosen eye will be occluded until the same or opposite button is pushed. Advancing or reversing the drum also clears the occlusion.
- B) Stereo tests are listed on the control unit by number. A lamp next to each test number signals when that target is being presented. Consult the chart for the name of the test.
- C) Peripheral vision target lamps are lit by pressing these buttons. A signal lamp indicates which eye is being tested.
- D) The test distance buttons will switch the lenses to the corresponding distance.
- E) The day/night switch allows the examiner to toggle between simulated bright “real” life daytime illumination and dim light nighttime illumination.
- F) Touch these buttons to advance or reverse to the next test. Keep the button depressed for continuous rotation. Occlusion settings will be reset for the next target.
- G) The head Sensor Override button has been eliminated on some models.

The Test

Positive occlusion

The VS-V incorporates a unique system for occluding (blocking out) the stereoscopic test target image seen by either eye. Each side of the test target is illuminated by a separate lamp. Occlusion of the desired eye is accomplished quickly and effectively by turning off the appropriate lamp using the Visionary Software or control panel.

A major function of occlusion is to determine the existence of *visual suppression*; the mental blocking out of an image seen by one eye so the *only* image registering in the brain is the one seen by the other eye. Normally, the images seen by the two eyes are fused into a single, integrated image.

Because the VS-V requires the eyes to work together, any suppression will become evident during the first two tests if the subject reports the image that *should* be visible to one eye does not appear.

In such cases, occlude the vision of the *opposite* eye: This usually causes the “non-seeing” eye to work hard enough so the “missing” image becomes visible. If it does *not*, it may be concluded the test subject is blind in that eye.

The occlusion system is also used with certain tests to provide official medico-legal data.

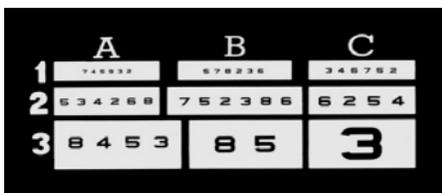
Stereoscopic Test Targets

Each of these permanently-mounted test targets presents somewhat differing images to the two eyes. The eyes must work together to fuse - or merge - both images into a single image, as shown in the illustrations.



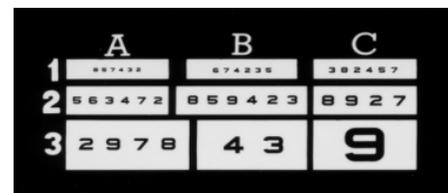
Acuity: Right Eye - Tests at far and near points

This acuity (fineness of visual discrimination) of the right eye is tested while the left eye is open and seeing. Results are calibrated at values from 20/200 to 20/20.



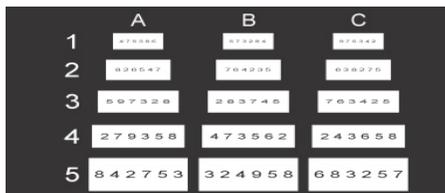
Acuity: Left Eye, Tests at far and near points

Similar to the preceding test this target measures the visual acuity of the left eye while the right eye is open and seeing. Values of 20/200 to 20/20 are provided.

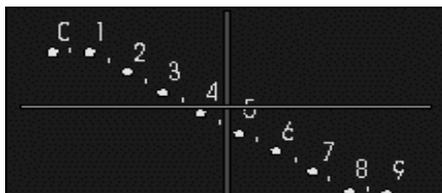


Acuity: Binocular - At far and near

This test presents the same number groups to both eyes simultaneously at acuities from 20/200 to 20/20. All three acuity targets employ Sloan-type numerals without serifs (finishing strokes).

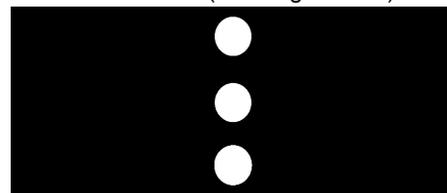


Acuity: Binocular for Night 100 cm and 60 cm - This acuity test presents the same number groups to both eyes simultaneously. Provides five ratings ranging from 20/70 to 20/20.



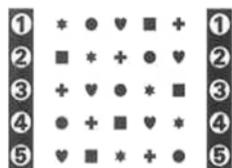
Phoria (eye co-ordination) - Test at far and near points

Are the eyes balanced to work together with comfort and efficiency? This target measures vertical and lateral phorias (the tendency of an eye to turn in, out, up, or down) in prism diopters.



Fusion - Tests at far and near points

Here's a check of one of the basics of visual efficiency: Whether the images seen by the two eyes merge into a single, integrated image. Two balls are presented to each eye. They should fuse into a column of three balls.



Stereopsis - At far and near

This 3-D target measures *stereopsis* (depth perception) due solely to the coordinated use of the eyes. The subject must name the symbol on each line that stands out from the others. A correct answer on row four shows 75% stereopsis.



Color Perception - One target at far

This target presents numbers in pseudo-isochromatic symbols. They indicate if a severe (red/green) or mild (blue/violet) discrimination deficiency exists, but do not further clarify the disorder.

Horizontal Peripheral Visual Fields Test

Miniature lamp (LED) targets between the lenses and recessed in the temple (side) areas of the viewing head show how far to the side a subject's visual field extends when (s)he looks straight ahead. Persons with “tunnel vision”, a grossly-restricted peripheral field, are quickly identified. The targets are selectively lit by individual buttons on the control panel or software to show a 45° nasal field and to check temporal fields at angles of 85°, 70°, and 55°. (A total field of vision up to 100° to 130° can be measured for each eye). The eyes may be tested separately or together.

The Record Form

Note: Use of the record form is not necessary with the Software program.

The VS-V Record Form (at right) makes record keeping easy: The examiner needs only to check the test subject's responses to provide a detailed record of his/her visual abilities.

(Complete instructions for filling out the record chart will be found in the section, "Test Administration".)

The area for noting subject responses to the stereographic tests is divided into clear and shaded columns: Any checks in the shaded columns indicate potential unsatisfactory performance. See page 14 for scoring guidelines. (For the phoria tests, horizontal shaded bars indicate a probable vision handicap.)

Results of the lateral peripheral vision tests are recorded on the front half while near vision tests are grouped on the back side.

Tests are identified by a sequence number and by descriptions to match call outs on the control panel.

It is often desirable to provide a second copy of the record form, either for the test subject or for a vision specialist to whom he/she may be referred. A carbon copy of the chart can be easily prepared using pencil carbon paper between two forms and writing with a ballpoint pen or hard lead pencil.

The record form is supplied in pads of 100 sheets each (3 pad minimum reorder).

Keystone VS-V Record Form (Standard Targets)

For use with Model 1155
VS-V Screeners

Name _____ Date _____
 Occupation _____ Age _____
 Does the examinee wear Glasses or Contacts (If yes, how often?) Always Sometimes
 What kind of Vision Correction? Distance Only Reading Multifocals
 1. Have you ever been examined by a vision specialist? No Yes How long since last exam? _____
 2. Do you have any difficulty with your eyes? No Yes What kind of difficulties? _____

FAR VISION TESTS --- Switch to FAR on control

TEST DESCRIPTION AND KEY (Corresponds to Remote Control Key)		UNACCEPTABLE	RETEST	ACCEPTABLE See Standards Guide (f)
F.1	RIGHT EYE: ACUITY A B C 1. 20 = 647638 25 = 42876 30 = 943862 2. 40 = 795923 50 = 357248 60 = 7236 3. 70 = 9574 100 = 92 200 = 6	20/200 = 5 20/100 = 92	20/70 = 9574 20/60 = 7236 20/50 = 357248	(One Miss) Allowed Per Line 20/30 = 943862 20/25 = 42876 20/20 = 547638
	LEFT EYE: ACUITY A B C 1. 20 = 746932 25 = 573236 30 = 348752 2. 40 = 534298 50 = 752398 60 = 6254 3. 70 = 8463 100 = 86 200 = 3	20/200 = 3 20/100 = 85	20/70 = 8463 20/60 = 6254 20/50 = 752398	(One Miss) Allowed Per Line 20/30 = 348752 20/25 = 573236 20/20 = 746932
	BOTH EYES: ACUITY A B C 1. 20 = 857432 25 = 674235 30 = 382457 2. 40 = 663472 50 = 859423 60 = 8927 3. 70 = 8463 100 = 42 200 = 9	20/200 = 9 20/100 = 48	20/70 = 2978 20/60 = 8927 20/50 = 859423	(One Miss) Allowed Per Line 20/30 = 382457 20/25 = 674235 20/20 = 857432

NIGHT VISION TESTS --- Switch to NITE on control (Read Column A)

F.4	BOTH EYES: ACUITY 1. 20 = 46922X 2. 25 = 12345X 3. 30 = 93824X 4. 40 = 79582X 5. 50 = 52388	20/50 = 52388	20/40 = 79582X	(One Miss) Allowed Per Line 20/30 = 93824X 20/25 = 123456 20/20 = 46952X
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INTERMEDIATE DISTANCE TEST 1 (100 cm) --- Switch to INT 1 on control (Read Column B)

I.1	BOTH EYES: ACUITY 1. 20 = 123456 2. 25 = 123456 3. 30 = 123456 4. 40 = 123456 5. 50 = 12345	20/50 = 12345	20/40 = 123456	(One Miss) Allowed Per Line 20/30 = 123456 20/25 = 123456 20/20 = 123456
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INTERMEDIATE DISTANCE TEST 2 (60 cm) --- Switch to INT 2 on control (Read Column C)

I.2	BOTH EYES: ACUITY 1. 20 = 54763 2. 25 = 123456 3. 30 = 46752X 4. 40 = 34268X 5. 50 = 85942X	20/50 = 85942X	20/40 = 34268X	(One Miss) Allowed Per Line 20/30 = 46752X 20/25 = 123456 20/20 = 54763X
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Preparation for Testing

Place the VS-V on a table, desk, or counter that provides sufficient space for the instrument, control unit and record forms. A desk/table height of 26-30 inches is recommended.

Position the instrument near the edge of the desk or counter. If subjects are to be tested while seated, be sure sufficient knee room is provided. Chairs for both the examiner and test subject should be straight-backed.

Equipment readiness

Before testing, check the VS-V to ensure it is in proper working condition:

- Is the unit transformer connected to a standard 220/240 volt a.c. outlet?
- Do both target illumination lamps light when the power switch is turned on?
- Do the horizontal field target lamps illuminate as the appropriate buttons on the control panel are depressed?
- Does the corresponding target illumination lamp go out when each of the "Occlude" buttons is pressed?
- Are the viewing lenses calibrated with the Elliptech Soft-Touch hand control? Lens operation can be checked by

pushing the far, near, intermediate 1 and intermediate 2 buttons lens distances buttons.

- Does the night vision button reduces the illumination on both targets?

It may be advisable to dust the VS-V and clean the lenses with soap and water and a soft cloth.

General test condition

VS-V screening tests should be given in a reasonably quiet room. Testing can be performed in virtually any area where traffic, noise or interruptions do not disconcert the test subject or examiner; and do not interfere with the accuracy or speed of the tests.

Extremely bright room lighting or glare may adversely affect the operation of VS-V units. For the best possible conditions, subdued room lighting is recommended.

If a number of persons are to be tested, each person should be admitted to the test area one at a time. This will prevent those waiting to take the tests from obtaining erroneous or advance information concerning responses that could affect test validity. (Although only the subject can see the test targets, oral remarks may be overheard by others.)

The examiner may be positioned anywhere in the immediate vicinity of the test subject where space is available for the control unit, record forms and/or the computer.

Test subject's posture

Good body posture is important to good vision. Proper posture maintained during testing is vital. An uncomfortable position will cause strain and distract the test subject.

The subject's back and head should be erect and the shoulders level. His/her forehead should rest comfortably against the instrument's headrest. This position should be maintained throughout the test period.

Adjustment of the height and angle of the VS-V is under direct control of the test subject. He/she may wish to grasp the side of the unit with one or both hands with the elbows resting on the desk or counter.

Do not allow the subject to pull back or away from the instrument between individual tests. Caution him/her against tilting the head to the side at anytime.

Corrective lenses

If the subject wears corrective lenses (eyeglasses or contact lenses) the tests should be conducted with the lenses worn as usual.

If lenses are worn only for reading or only for distance vision, they should be removed when testing types of vision for which the lenses were not prescribed.

Exercise caution when testing a person recently fitted with new glasses. Many vision specialists do not fit a patient with full-correction lenses, but rely on the patient to help him/herself as time progresses. Therefore, poor scores on the screening tests shortly after such a fitting may not be truly accurate. In that case, a retest after two months is recommended .

Test Administration

When vision screening is conducted with the VS-V it is important that an organized procedure be followed and standardized questions be used. Only in this way can consistent results be assured. The sequence of the tests and the instructions given to the subject can effect his/her performance.

The test questions within the Visionary Software and listed on the following pages have been found to evoke quick responses from the average test subject. However, as the individual examiner becomes experienced in administering the tests, (s)he may wish to adapt the specific wording of each question to his or her own style.

Responses should be prompt. Allow five to ten seconds after the target is presented and the question has been asked for the subject to respond. An obvious hesitation indicates an effort to guess. Since there is no "penalty" for an "incorrect" answer, encourage the subject to be as frank as possible in telling what (s)he sees.

Acknowledge each response, but be careful not to indicate approval or disapproval, praise or disappointment. Do not "lead" the subject into giving any kind of response. Keep the amount of conversation to a minimum during testing to help preserve the objectivity of the tests and save examination time.

Recording the findings

Speed of recording will depend on the examiner's familiarity with the test targets and what type of recording is in use. The recording form has been designed to show both expected and abnormal responses so scoring can be done by checking the appropriate space. The software program allows recording with the click of a mouse.

If undesirable visual characteristics are noted, responses are likely to be slower than usual and the examiner should allow additional time. Even in such cases, the complete screening examination should take no more than three to five minutes.

Help the test subject do well

Visual skill ratings can be significantly altered by the attitude of the examiner. It is the examiner's purpose to evoke the best performance the subject can give.

In normal living people make the best possible use of their visual skills and do not function under the handicap of their worst moments. Thus, if four balls are seen in the fusion tests rather than the expected three, give the test subject an opportunity for the two white balls to soon merge into one.

If a younger child is being tested, be sure (s)he can recognize and identify the numerals from 1 through 9. Most of the screening tests employ numerals as stimuli.

The information on whether the individual wears corrective lenses is obtained at the time of testing. As mentioned, lenses should be worn during the test as they are normally worn. If the lenses are worn at all times, both near and far point tests are tested with the prescription. If lenses are worn only for reading or distance vision, they should be used only for the appropriate section of the test series.

Medico-legal records

Many medico-legal records require distance acuity to be measured without corrective lenses and without occluding the eye. If the VS-V is used to provide such information, these special tests should be conducted after the standard test sequence has been completed.

(This test is usually required only at distance but varying state compensation laws may indicate that the same type of test should be repeated at near point).

The testing procedure is the same except the right occluder button is depressed during left eye testing and the left occluder button is depressed during right eye testing. Be sure that corrective lenses are removed.

Test Procedure: Stereoscopic Tests

The test subject should sit or stand in front of the VS-V instrument, observing the rules of posture on page 9. Administer the tests with glasses worn by the subject as usual.

Far Point Tests

Set the test distance to far by selecting the corresponding button on the control panel. **Note:** Software users please disregard hand control directions. The software program will automatically make the needed changes.

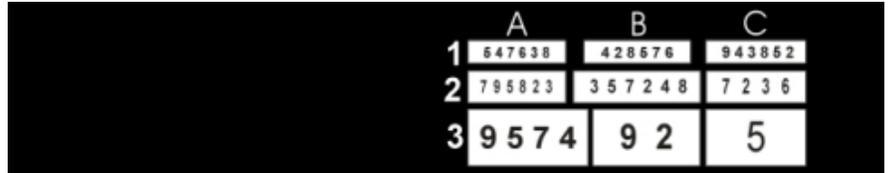
Be sure bifocal wearers are looking through the upper segments of their lenses.

If visual suppression exists, it will show up during the first two tests. The existence of suppression is important because it reliably indicates some *other* binocular vision problem. When a certain stress level is reached in the lack of binocular co-ordination, one eye simply lets the other work alone and with comfort. Cases of suppression deserve immediate referral to a vision specialist.

Depending on the severity of the suppression problem, further screening for binocularity - as with Tests 4, 5, and 6 - may be futile.

Test F-1: Far Point Acuity (right eye)

Question: "Here are nine blocks with numbers in them. Please read me the numbers in the first block in the first (Box 1-A).



Response: If five of the six numerals are correctly identified the subject is considered as having 20/20 acuity in the right eye and need not read further. If the first block is not correctly read, have the subject continue across each row consecutively from left to right until the numbers in a block are called correctly.

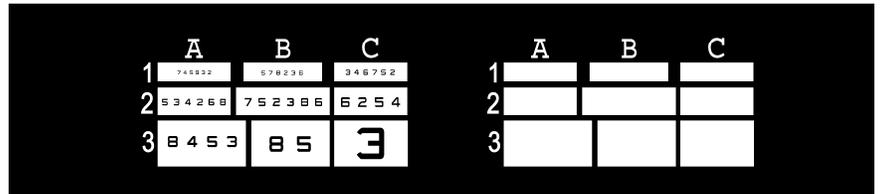
Recording: Place a check mark beside the line on the record form showing the first box correctly read. (Please note that Box 3C 20/200 is listed *first* on the form and box 1A 20/20 is listed last).

Remarks: The subject may report that no boxes or numerals are seen. This indicates the existence of a visual *suppression* in the right eye. Should this occur, *occlude* the left eye and proceed with test.

When the occluder is used, responses on the record form should be *circled* rather than checked.

Test F-2: Far Point Acuity (left eye)

Question: "Now let's repeat this kind of test. The only thing that has changed are the numbers in the blocks. Can you tell me the numbers in block 1-A?"



Recording: Follow the same procedure as Test F-1.

Remarks: The subject may not realize that the first two test each measure the acuity of only one eye. To maintain test accuracy, exercise caution that (s)he does not learn this.

Test F-3: Far Point Acuity (binocular)

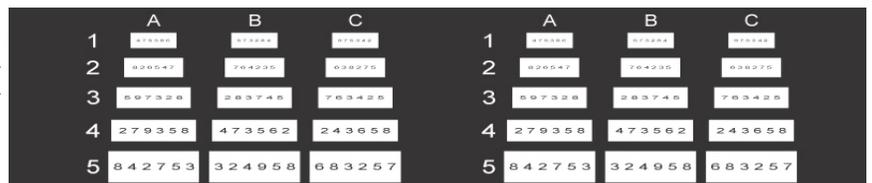
Question: "Now let's repeat this kind of test. The only thing that has changed are the numbers in the blocks. Can you tell me the numbers in block 1-A?"



Recording: Follow the same procedure as Test F-1.

Tests F-4, I-1, I-2

This special three-in-one target is used to test night (low-light) vision as well as intermediate vision at two distances. The intermediate vision tests are provided at 26- and 39-inch distances.



Test F-4: Night Binocular Acuity

For this test, set the vision screener illumination to night position by pressing the day/night button on your hand control.

Question: “Here you see three columns. Please read me the numbers in the first column from the left starting at the top row (Box 1-A)”

Response: If the numbers in the top row are correctly identified the examinee is considered as having 20/20 binocular acuity during the night and you can move on to the Intermediate Distance Test (next column on the same target). If the subject cannot identify the numbers in the top row (row 1) correctly have them read the numbers in row 2. Repeat this process until the examinee correctly identifies a full row.

Recording: Place a check mark beside the line on the record form showing the first box correctly read.

Do not use the control panel to advance to the next target as the following test will use column 2 of this same target.

Test I-1: Intermediate Binocular Acuity Intermediate Distance 1 (39 inches)

Make sure to turn off the night vision feature by pressing the day/night button on your hand control. Now activate the Intermediate 1 lens by pushing the corresponding button on your hand control.

Conduct this test in the same manner as the night vision test, having the examinee start at the top row of column 2 (Box 2-A). If the examinee successfully identifies the numbers in row 1 they have 20/20 vision at Intermediate distance 1. If not, repeat this process until the examinee correctly identifies a full row.

Test I-2: — Intermediate Binocular Acuity Intermediate Distance 2 (26 inches)

Switch to the Intermediate Distance 2 lens by pressing the corresponding button on the hand control. This test makes use of the third and final column on this target.

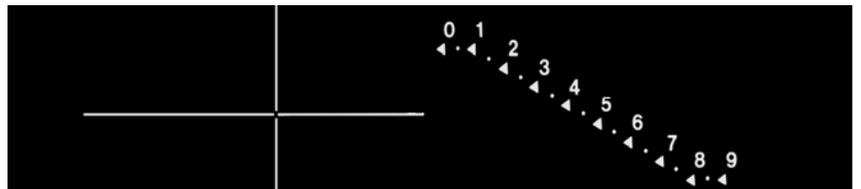
Use the same format during this exam, starting at the top row and working down until the examinee identifies a full row correctly.

Test F-5: Far Point Phoria

(The red line measures *lateral phoria*. The green line measure *vertical phoria*).

If you have administered the Intermediate test, make sure to set the lens back to far on the Elliptech Hand Control.

Question: “Do you see a scale of numbers and dots with two crossed lines running through it?”



“At what number, or between what numbers, does the green line pass through the scale?” (*Record response*)

“At what number, or between what numbers, does the red line pass?”

Response: The expected answer for both lines is “Between 4 and 5.” Response may be delayed by the apparent movement of the red line. To assist in speeding a response, ask for a number within the range of movement. When this has been obtained determine how far each way the movement continues.

Recording: Check the appropriate spaces on the Record Form to show exactly what the test subject reports. If the red line continues to *fluctuate*, draw a line between the numbers between which it moves (if using the software program, you must select one number). If the line *keeps moving in one direction*, wait until it stops before checking the record form.

Remarks: If a subject with binocular vision sees *only* the crossed lines, (s)he is either suppressing or suffers from amblyopia (“lazy eye”), strabismus, or a similar deviated eye condition. Discontinue testing.

Some test subjects may report one or both of the lines seems to break before and after passing through the scale. This is not important. However, a decided *head tilt* is important and can significantly affect the finding. Be sure proper posture is maintained.

Should a subject *wearing glasses* report that the *green* line passes through the scale at some point other than between 4 and 5, test him/her a second time without glasses. If on the retest the line passes correctly between 4 and 5, the probable cause of the discrepancy is *bent eyeglass frames*. Recommend to the subject that (s)he have an optician check the glasses soon.

Unusually high vertical or lateral phoria, a high deviation from the expected, can result in headache or visual fatigue. (Such fatigue can be confirmed if the test subject has experienced occasional “double vision”.)

Test F-6: Far-point Fusion

Question: "How many balls do you see?"

Response: The expected answer is three balls. A satisfactory answer is four balls becoming three.

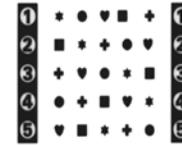
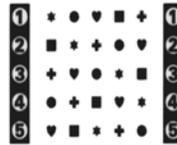
Recording: Check the appropriate space on the record form.

Remarks: If only two balls are seen (which is highly unlikely), determine by their color whether they are seen by the right or left eye. The blue ball is presented to the left eye only. If four balls are seen—either initially or after a few seconds—determine if the blue ball is to the left or right of the red one.



Test F-7: Far-point Stereopsis

Question: Here you see five rows of symbols (shapes) with numbers on each side. Each line across has five different symbols. In the first line (at the top) is a star, a ball, a heart, a box, and a cross.



"Do one of the symbols in this line seem to float out in the air closer to you than the others?"

"Which one?"

"In the second line, which one floats out closer than the others?" Etc.

Response: The normal response is to correctly report all five lines. If the subject does not report the box as "floating out" toward him/her in the first row, it may be necessary to rephrase the question for better understanding.

Recording: Place a check mark on the last symbols correctly read.

Test F-8: Color Vision (red/green) and (blue/violet)

This target presents test for severe color blindness (red/green) on the top row and mild color blindness (blue/violet) on the bottom row.



Question: Here you have two rows, each containing three circles. Each circle contains a number which the examinee needs to identify.

"What number do you see in the circle on the top left? In the circle to the right?" Etc....

Response: Correctly naming two out of three numerals in each row is the minimum acceptable answer. Even this could indicate some possible color blindness.

Recording: Check the number of circles on which all three numerals are correctly identified.

Remarks: Failure to name two out three numbers correctly on the top (red/green) row indicates possible severe color blindness.

Failure to name two out three numbers correctly on the bottom (blue/violet) row indicates possible mild color blindness.

Test F-9: Peripheral Visual Fields

This test shows a subject's range of vision to each side when (s)he looks straight ahead. Have the subject direct his/her attention to a far-point stereo target and light the peripheral target lamps at random. The stereo target used should be a simple binocular target.

Thus, an excellent time to introduce the peripheral vision test into the total VS-V series is after the Far-Point color vision tests have been completed and before the Near-Point stereoscopic test are begun.

Tell the subject to continue looking at the numbered circles of the color vision target. Explain that at any time a light may flash to the left or right side of the target. When it does, the subject is to indicate "left side", "right side", or "both sides."

The "N" buttons on the control panel test nasal fields (angle of 45° across the nose). Testing the right eye nasal field should produce a "left side" response, and vice versa.

All peripheral target lamps should be lit, but the order of their appearance is left to the examiner. Check the appropriate box on the form for each target identified.

If an individual is blind in one eye, a total range for the other eye should be obtained. This is done by depressing both the "N" and "70" buttons simultaneously. A response of "both sides" is expected. If using the software, the control panel must be used for this action.

Near Point Tests

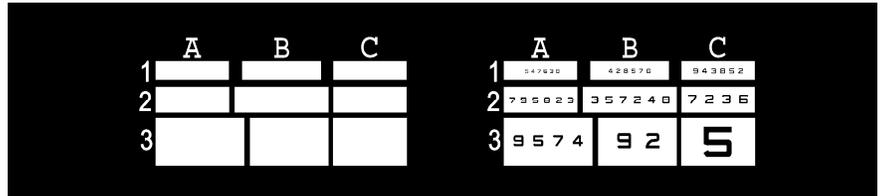
While the test subject is still looking at the color vision target, move the distance selector switch to Near. (The "Near" indicator lamp will light.)

Explain to the subject you will now check his/her visual skills at the optical equivalent of normal reading distance and he/she must look through a slightly different set of lenses.

Have the subject put on or remove corrective lenses as indicated. Bifocal wearers should now be viewing the target through the lower segments of their lenses. Let the subject adjust his/her head position in the instrument, if required, and become acclimated to the near distance. Advance to Test N-1.

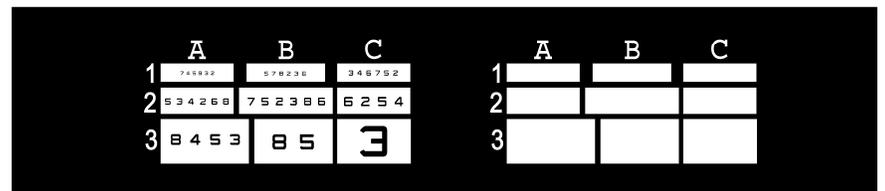
Test N-1: Near-point Acuity (right eye)

Procedure: Follow the same procedures as for (far-point) Test F-1. Employ the occluders as required.



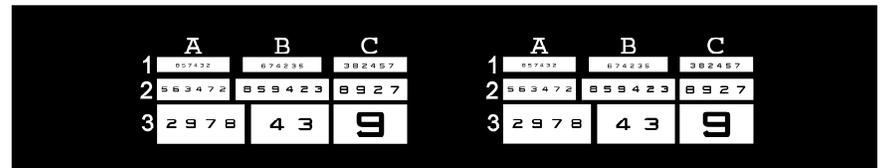
Test N-2: Near-point Acuity (left eye)

Procedure: Testing and recording follows the same procedure as the previous acuity tests.



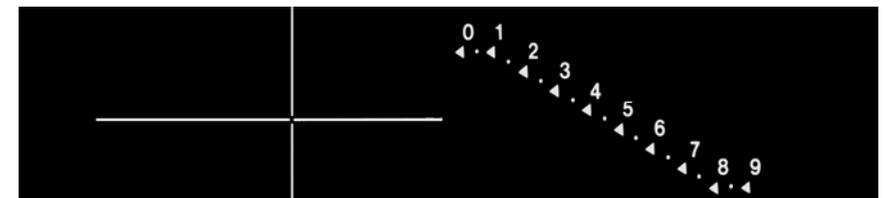
Test N-3: Near-point Acuity (binocular)

Procedure: Follow the same procedures as for previous acuity tests.



Test N-4: Near-point Phoria

Procedure: Follow the same procedures as for the far-point phoria tests (F-4). Remember that apparent movement of the red (vertical) line may delay response. Ask for a number within the range of movement and then that determine how far each way the motion continues.

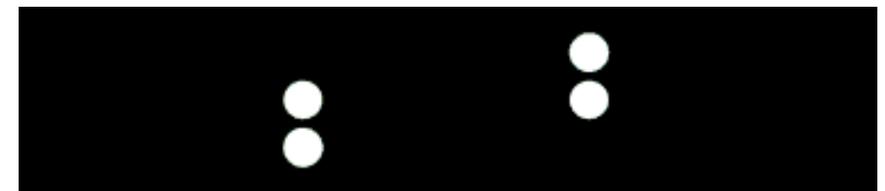


Remarks: A test subject wearing bifocals may show a vertical phoria (measured by the green line) at the near distance even though none was noted at far point. Persons who do not wear corrective lenses normally give the same responses at both distances.

Test N-5: Near-point Fusion

Procedure: Follow the same procedures as for far-point Test F-5.

Remarks: This test is particularly important for person who must use their eyes for extended periods doing close work: Maintaining single, binocular vision at near point requires greater visual coordination than at far point.



Test N-6: Near-point Stereopsis

This test is optional, since the demonstration of good stereopsis at distance almost assures good performance at Near Point. Further, this skill is not vital to the great majority of Near-Point visual tasks.



Interpretations of Test Scores

In general, the results of the VS-V screening tests should not be considered separately, but as a *whole*. Taken in entirety, results will almost always provide a reliable indication of the test subject's visual efficiency. It must be remembered that the test series is designed to identify persons who may benefit from professional vision care. It is not intended to provide diagnostic or clinical data.

REFER for full eye-examination any subject who scores one or more test in the "unacceptable" area of the record form, or whose side field of vision is less than 70 degrees on one or both sides.

Scores in the lightly shaded area indicate a somewhat doubtful performance. Subjects whose occupation requires good vision (e.g. Display Screen operators) and who score in the lightly shaded area should be referred.

NOTE: Those failing only the stereopsis (depth perception) and/or color vision tests need not be referred, but should be made aware of their deficiency.

Suggested Visual Standards

If all of an individual's test scores are recorded in the clear area of the "Acceptable" columns on the record form, it may be assumed that (s)he has adequate visual skills for normal living.

If some scores are marked in the lightly shaded area of the "Acceptable" columns, the subject can be considered to have "doubtful performance".

Some authorities will accept 20/40 acuity as a passing minimum and many driver licensing agencies accept 20/40 as a minimum standard. If a subject's occupation demands good vision at the reading distance but not at Far Point, consider 20/30 as a minimum score for Near Point and 20/40 as the minimum score at Far Point. The opposite would apply if visual skills are critical at far but not at near, as in the case of a crane operator.

Consider scores in the clear area of the record form as good general standards for visual abilities, but allow scores in the lightly shaded areas if those visual tasks are not in demand. Scores falling in the darkly shaded "Unacceptable" areas of the Record Form indicate that the subject will benefit from a professional vision examination. Be sure to test subjects with eye glasses on if glasses have been prescribed.

Do not refer for professional consultation for "Unacceptable" performance on the color test. No remedy has yet been perfected for defective color vision. However, for reasons of safety, persons who are color blind should be made aware of their deficiency.

Stereopsis (Test F-7, N-6) is a highly developed visual skill subject to maturation factors. Persons over the age of 25 years may do better in this test than those under 25. However, adults whose occupations involve moving machinery or materials should (for safety reasons) score in at least the lightly shaded "Acceptable" area. This level indicates 75% stereopsis in the Shepherd-Fry Scales.

Phoria readings (Test F-5, N-4) are important and "failure" can indicate reasons for headaches and fatigue. The record form gives the following passing ranges:

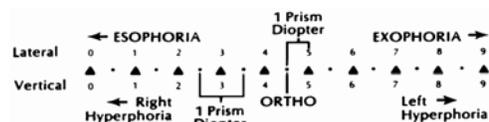
Distance (F-5)

Phoria, Lateral: Not more than 6 prism diopters esophoria or 4 prism diopters exophoria

Near (N-4)

Phoria, Vertical: Not more than 4 prism diopters esophoria or 6 prism diopters exophoria

Not more than 1 prism diopter right or left hyperphoria



TEST KEY

Normal Color Vision

Test (F-8) "Color Vision (red/green)" *Severe* — Examinee must identify numerals 32, 79, and 23 to pass

Test (F-8) "Color Vision (blue violet)" *Mild* — Examinee must identify numerals 92, 56, and 63 to pass.

Normal Depth Perception (Stereopsis)

Test (F-8 and N-6) Identification of the stand-out symbol in line 4

Line	1	2	3	4	5
Symbol	Box	Heart	Cross	Star	Cross
Shepherd-Fry Scale	10%	30%	60%	75%	85%
Degree of Arc	592	208	74	45	32

TEST KEY

Important: Refer for professional consultation if suppression is indicated on the phoria test: if only the yellow numbered line is seen or only the crossed red and green lines are seen

Peripheral Vision Field

This test is particularly significant in the case of vehicle operators. A person with normal lateral vision will be able to see a moving object when it is 90° (or at right angle) to his eye on the temporal (outside) side.

No exact standards have been developed that show the point where diminution of lateral fields has an effect on accidents. Yet authorities state that a field more restricted than 60° would be a serious danger to a vehicle or cyclist.

A temporal reading of 70° should be considered the minimum standard for safety. (The U.S. Interstate Commerce Commission requires a lateral field of at least 70° for each eye).

It is suggested that anyone who holds a motor vehicle operator's license demonstrates a severely restricted field, even though his/her other visual skills are normal, (s)he be referred to a vision specialist for examination and professional opinion.

Additional aids to test interpretation

Some children may not be able to read at the expected level before age seven because the maturation of binocular visual skills has not kept pace with their chronological age. Therefore, younger children who fail the *lateral phoria* and *fusion* tests may be visually immature rather than visually deficient.

With individuals of any age, definite *vertical phoria* which is *not* due to bent eyeglass frames will provoke a tendency to diplopia (seeing double). At far point this presents a definite safety hazard. At near point it can adversely affect work or study performance.

Periodic retesting

An individual's vision is not static. Vision changes with time and can be affected by such factors as age, general health, emotional disturbances, fatigue and working conditions. It is thus desirable that visual skills be periodically re-screened once a year.

Routine Maintenance

Under normal use conditions, the VS-V instrument requires minimum attention if it is protected by the dust cover when not in use. Virtually no repair or adjustment is needed, since all operating components are protected and solid-state circuitry assures exceptionally high reliability.

Cleaning

Be sure to disconnect the unit from its power supply before cleaning.

Periodically, some cleaning will be necessary. The main instrument housing and Elliptech control unit should be dusted with a soft cloth or brush, and the lenses washed with a soap-and-water dampened cloth and dried with a soft cloth or tissue. If the instrument has become very soiled, it may be cleaned with a mild soap-and-water or general purpose cleaner dampened cloth. Other solvents are not recommended.

Lamp Replacement

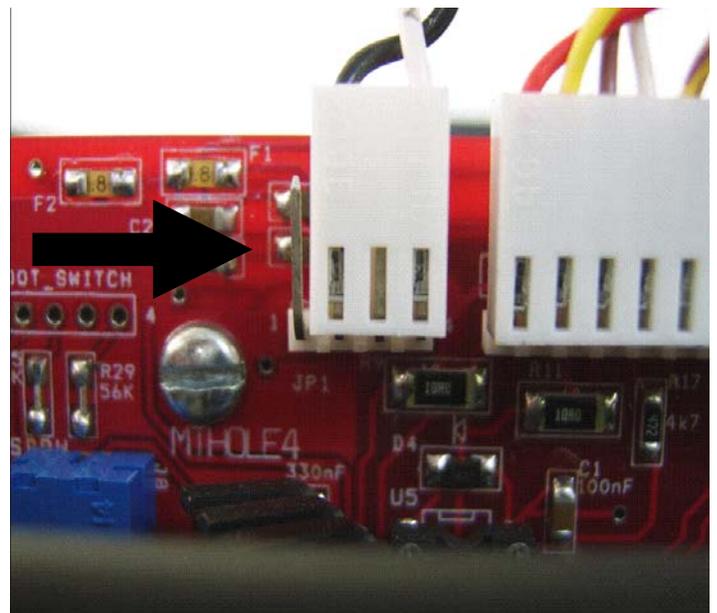
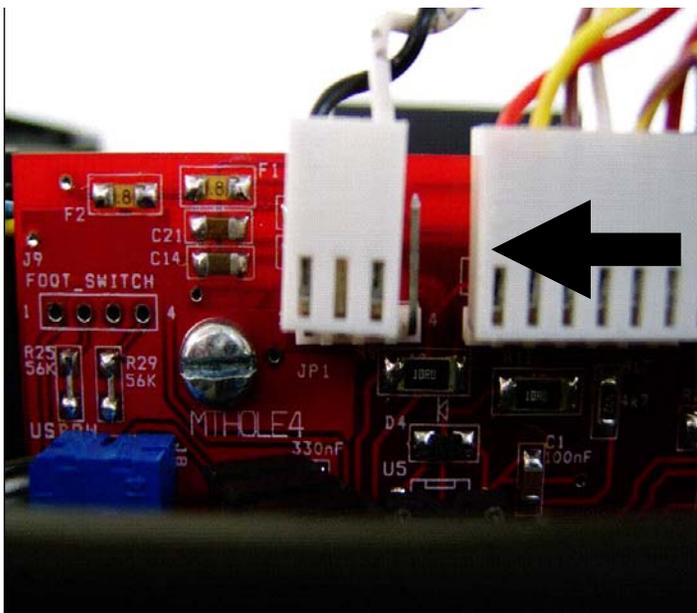
Two Nichia NSPW515BS Daylight LED lamps provide illumination of the stereo targets. Though the lamps are long-life rated, replacement may eventually be required. Contact your local distributor to order replacement LEDs. Carefully follow the instructions provided with the lamps as improperly installing them can cause immediate failure.

The peripheral vision test targets in the viewing head and the signal lights on the Elliptech control panel are light-emitting diodes (LEDs). They are designed for extremely long life and should not require replacement during the lifetime of the VS-V.

Troubleshooting if the Instrument Will Not Turn On

In the unlikely event that a fuse has blown on the mother card, the vision screener will not activate after turning on the power switch. If this occurs a connector on the inside of the machine needs to be moved over one position to receive power from one of the backup fuses. Please follow the steps below

- Remove the top of the instrument.
- Attached to the on-off switch is a black and white cable, follow this to the other end where it is attached to a white connector with 3 terminals.
- Turn the instrument so the target drum is to your left and the eye shield is to your right. You will now be facing the red mother card.
- Remove the specified connector from the four pin receptacle where it is currently placed. There should be one unoccupied pin to the right of the connector.
- Move the connector one position to the right so it now occupies the pin furthest to the right, and the unoccupied pin is to the left.



Detailed Explanation of Stereo Vision

Two Eyes = Two Separate Views

The eyes of a human are positioned side-by-side. Each eye views the same objects or scenery from a slightly different angle. The two views have much in common, but each eye picks up visual information the other does not.

Two Eyes = Three Dimensions (3D)

Each eye captures its own view and the two separate images are sent to the brain for processing. The two images arrive simultaneously in the back of the brain and are united into one picture. The mind achieves this by matching up the similarities in the two views and adding in the small differences. These small differences between the two images add up to a *big* difference in the final picture. During this process, the views become a three-dimensional *stereo* picture.

The word "stereo" comes from the Greek word "stereos" which means firm or solid. With stereo vision you see an object as solid in three spatial dimensions--width, height and depth. It is the added perception of the *depth dimension* that makes stereo vision so rich and special.

Stereo Vision Has Many Advantages

Stereo vision--or stereoscopic vision --likely evolved as a means of survival. With stereo vision, humans can see **where** objects are relative to their own bodies with much greater precision--especially when objects are moving toward or away from them in the depth dimension. It is possible to see *some*, not a lot, around solid objects without moving the head and even perceive and measure "empty" space with the eyes and the brain.

Stereo Vision Is A Definite Plus

According to the web site of the American Academy of Ophthalmology, September, 1996: "...many occupations are not open to people who have good vision in one eye only [*people without stereo vision*]" Here are a few examples of occupations that depend heavily on stereo vision:

- Baseball player
- Waitress
- Driver
- Architect
- Surgeon
- Dentist

Here are just a few examples of general actions that depend heavily upon stereo vision:

- Throwing, catching or hitting a ball
- Driving and parking a car
- Planning and building a three-dimensional object
- Threading a needle and sewing
- Reaching out to shake someone's hand
- Pouring into a container
- Stepping off a curb or step

Make sure your examinees have Stereo Vision

People without stereo vision often are unaware of it because they have never had it. Vision testing with a Keystone screener identifies subjects with stereo vision problems. If defects are found, referral to an optometrist or ophthalmologist for a full eye exam is warranted.

(Info provided by Optometrist Network www.optometrists.com.)

Vision Terms Glossary

Accommodation: The power to adjust the focus of the eyes for seeing objects distinctly at different distances.

Acuity, visual: Sharpness of vision. Ability to distinguish detail.

Amblyopia: Sometimes referred to as "lazy eye", amblyopia is decreased vision in one or both eyes not caused by anatomical damage. Vision therapy often is used to treat amblyopia, since the condition is usually uncorrectable by optical means (e.g. eyeglasses).

Astigmatism: A common condition, often occurring with near-sightedness or far-sightedness, where all of the rays of light entering the eye do not focus on the same plane, resulting in out of focus vision. The cause is unknown. A minor degree of astigmatism is considered normal and does not need correction.

Binocular: Using two eyes simultaneously.

Binocular Vision: The ability to use the two eyes simultaneously to focus on the same object and to fuse the two images into a single image.

Color blindness: An inherited condition most commonly seen in men and with the colors red and green. It is caused by a deficiency of certain "cones", or color detectors, in the eye. Although there is no cure, this condition does not significantly impact most day to day vision functions.

Convergence: Inward movement of eyes toward each other.

Depth perception: Stereopsis - is how a person judges how far away an object is from him/her, combining such factors as the apparent size of the object, its apparent rate of motion, the object's height in the field of vision, the image's clarity and various shadows.

Diplopia: Commonly known as "double vision," when a person sees two images of an object instead of one. Binocular diplopia - double vision in both eyes - is caused by a misalignment of the eyes and is often treated with vision therapy. Monocular diplopia - double vision in only one eye - can be caused by factors including astigmatism, dry eye and retinal problems.

Esophoria: Commonly referred to as "being cross-eyed" or under

convergence - occurs when the two eyes do not aim simultaneously at the same object and instead point in different directions - in this case inward. Esophoria impacts binocular vision - the ability of both eyes to work together - and depth perception.

Exophoria: Commonly referred to as "being wall-eyed" or Over convergence - occurs when the two eyes do not aim simultaneously at the same object and instead point in different directions - in this case outward. Esophoria impacts binocular vision - the ability of both eyes to work together - and depth perception.

Far Point: 6 meters (20 feet) to infinity.

Fusion: Term that defines how well both eyes work together to combine the images seen into one clear, coherent joined image.

Heterophoria: A squint due to weak eye muscles.

Hyperopia - or farsightedness: Occurs when light rays focus behind a person's retina, as opposed to directly on it. A farsighted person can see distant objects clearly but has difficulty seeing objects close by.

Ishihara test: A test that screens individuals for color blindness.

Monocular: Pertaining to one eye.

Muscle Balance: The tendency of either eye to remain in the position of fixation, when fusion of images is prevented; orthophoria.

Muscle Imbalance: The tendency of either eye to turn away from the position of fixation, when fusion of images is prevented; esophoria or exophoria.

Myopia - or nearsightedness: Occurs when light rays focus in front of a person's retina, as opposed to directly on it. A nearsighted person can see objects close to them clearly but has difficulty seeing objects that are far away.

Near Point: The average reading distance, 14 to 16 inches.

Occluders: Any device used by a vision health professional to temporarily obscure vision in one or both eyes while testing eye functions.

Orthophoria: Expected position of eyes in relation to each other.

Peripheral vision: Refers to the areas at the edges of the vision field - what a person sees "out of the corner of their eyes." Loss of peripheral vision - often called "tunnel vision" - can be caused by stroke, glaucoma, migraine headaches or retinal damage.

Phoria, Lateral: Descriptive of the relative horizontal position assumed by the eyes when dissociated (no fusion). When the tendency is to turn outward from a given position, the condition is known as exophoria. When the tendency is inward, the condition is known as esophoria. Phoria are indices of the accommodative-convergence relationship and indicate a lack of coordination between the eyes.

Phoria, Vertical: Description of the relative, vertical position assumed by the eye when dissociated. When the tendency is for the right eye to turn upward, the condition is known as right hyperphoria. When the left eye tends to turn up, the condition is left hyperphoria.

Snellen Chart: Printed letters of a special design, arranged in groups of different sizes on a test card and used to determine visual acuity.

Strabismus: "Crossed eyes" - a condition where a person cannot correctly align both of his/her eyes - one or both eyes turn up, down, in or out. To correct for the double vision that results from this, people with strabismus often "suppress" the visual input from one of the eyes, causing the non-suppressed eye being stronger than the suppressed one.

Stereopsis: See Depth Perception

Stereotarget: A pair of photographs or reproductions mounted in an instrument designed to present each eye with a separate image.

Suppression: The voluntary or involuntary non-use of vision, usually by one eye.

Vision Screening: A test for many facets of functional vision, designed to identify subjects who can benefit from an examination by a vision specialist.

Vision Specialist: Ophthalmologist or Optometrist.

Keystone VS-V Record Form (Standard Targets)

For use with Model 1155
VS-V Screeners

Name _____ Date _____

Occupation _____ Age _____

Does the examinee wear Glasses or Contacts (If yes, how often?) Always Sometimes

What kind of Vision Correction? Distance Only Reading Multifocals

1. Have you ever been examined by a vision specialist? No Yes How long since last exam? _____

2. Do you have any difficulty with your eyes? No Yes What kind of difficulties? _____

FAR VISION TESTS --- Switch to FAR on Elliptech Hand Control

	TEST DESCRIPTION AND KEY (Corresponds to Remote Control Key)	UNACCEPTABLE	RETEST	ACCEPTABLE See Standards Guide (1)
F-1	RIGHT EYE: ACUITY A B C 1. 20 = 547638 25 = 428576 30 = 943852 2. 40 = 795823 50 = 357248 60 = 7236 3. 70 = 9574 100 = 92 200 = 5	20/200 = 5 20/100 = 92	20/70 = 9574 20/60 = 7236 20/50 = 357248 20/40 = 795823	(One Miss Allowed Per Line) 20/30 = 943852 20/25 = 428576 20/20 = 547638
	LEFT EYE: ACUITY A B C 1. 20 = 745932 25 = 578236 30 = 346752 2. 40 = 534268 50 = 752386 60 = 6254 3. 70 = 8453 100 = 85 200 = 3	20/200 = 3 20/100 = 85	20/70 = 8453 20/60 = 6254 20/50 = 752386 20/40 = 534268	(One Miss Allowed Per Line) 20/30 = 346752 20/25 = 578236 20/20 = 745932
	BOTH EYES: ACUITY A B C 1. 20 = 857432 25 = 674235 30 = 382457 2. 40 = 563472 50 = 859423 60 = 8927 3. 70 = 2978 100 = 43 200 = 9	20/200 = 9 20/100 = 43	20/70 = 2978 20/60 = 8927 20/50 = 859423 20/40 = 563472	(One Miss Allowed Per Line) 20/30 = 382457 20/25 = 674235 20/20 = 857432

NIGHT VISION TESTS --- Switch to NITE on control (Read Column A)

F-4	BOTH EYES: ACUITY 1. 20 = 475386 2. 25 = 826547 3. 30 = 597328 4. 40 = 279358 5. 50 = 842753	20/50 = 842753	(One Miss Allowed Per Line) 20/40 = 279358	20/30 = 597328 20/25 = 826547 20/20 = 475386
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INTERMEDIATE DISTANCE TEST 1 (100 cm) --- Switch to INT 1 on control (Read Column B)

I-1	BOTH EYES: ACUITY 1. 20 = 573284 2. 25 = 764235 3. 30 = 283745 4. 40 = 473562 5. 50 = 324958	20/50 = 324958	(One Miss Allowed Per Line) 20/40 = 473562	20/30 = 283745 20/25 = 764235 20/20 = 573284
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INTERMEDIATE DISTANCE TEST 2 (60 cm) --- Switch to INT 2 on control (Read Column C)

I-2	BOTH EYES: ACUITY 1. 20 = 975342 2. 25 = 638275 3. 30 = 763425 4. 40 = 243658 5. 50 = 683257	20/50 = 683257	(One Miss Allowed Per Line) 20/40 = 243658	20/30 = 763425 20/25 = 638275 20/20 = 975342
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FAR VISION TESTS --- Return to FAR on Elliptech Hand Control

TEST DESCRIPTION AND KEY (Corresponds to Remote Control Key)	UNACCEPTABLE	RETEST	ACCEPTABLE See Standards Guide (1)
F-5 {	PHORIA (EYE COORDINATION) Red—Lateral	ESO 0 1 2 3 4 5 6 7 8 9 EXO ▲ . ▲ . ▲ . ▲ . ▲ . ▲ . ▲ . ▲ . ▲	
	Green - Vertical	RIGHT H. 0 1 2 3 4 5 6 7 8 9 LEFT H ORTHO	
F-6	FUSION ⁽³⁾	Four Balls	Four then Three Three Balls
F-7	STEREOPSIS (Depth Perception)	Box Heart Cross	Star Cross
F-8 {	COLOR Severe (Red/Green) 32 79 23	None Correct	One Correct Two or Three Correct
	COLOR Mild (Blue/Violet) 92 56 63	None Correct	One Correct Two or Three Correct
	HORIZONTAL FIELD TESTS ⁽⁴⁾	LEFT SIDE <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 85° 70° 55° NASAL	RIGHT SIDE <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> NASAL 55° 70° 85°

NEAR VISION TESTS --- Switch to NEAR on control

TEST DESCRIPTION AND KEY (Corresponds to Remote Control Key)	UNACCEPTABLE	RETEST	ACCEPTABLE See Standards Guide (1)	
N-1	RIGHT EYE: ACUITY		(One Miss Allowed Per Line)	
	A B C 1. 20 = 547638 25 = 428576 30 = 943852 2. 40 = 795823 50 = 357248 60 = 7236 3. 70 = 9574 100 = 92 200 = 5	20/70 = 9574 20/200 = 5 20/60 = 7236 20/100 = 92 20/50 = 357248	20/40 = 795823	20/30 = 943852 20/25 = 428576 20/20 = 547638
	LEFT EYE: ACUITY		(One Miss Allowed Per Line)	
N-2	A B C 1. 20 = 745932 25 = 578236 30 = 346752 2. 40 = 534268 50 = 752386 60 = 6254 3. 70 = 8453 100 = 85 200 = 3	20/70 = 8453 20/200 = 3 20/60 = 6254 20/100 = 85 20/50 = 752386	20/40 = 534268	20/30 = 346752 20/25 = 578236 20/20 = 745932
	BOTH EYES: ACUITY		(One Miss Allowed Per Line)	
	A B C 1. 20 = 857432 25 = 674235 30 = 382457 2. 40 = 563472 50 = 859423 60 = 8927 3. 70 = 2978 100 = 43 200 = 9	20/70 = 2978 20/200 = 9 20/60 = 8927 20/100 = 43 20/50 = 859423	20/40 = 563472	20/30 = 382457 20/25 = 674235 20/20 = 857432
N-4 {	PHORIA Red - Lateral	ESO 0 1 2 3 4 5 6 7 8 9 EXO ▲ . ▲ . ▲ . ▲ . ▲ . ▲ . ▲ . ▲ . ▲		
	Green - Vertical	RIGHT H. 0 1 2 3 4 5 6 7 8 9 LEFT H ORTHO		
N-5	FUSION ⁽³⁾	Four Balls	Four Then Three Three Balls	
N-6	STEREOPSIS	Box Heart Cross	Star Cross	

- (1) See Visual standards guide for recommended minimum visual standards for general categories.
- (2) 60 cm distance test is useful when evaluating operators of visual display terminals (computers, word processors, etc.).
- (3) A Fusion Test indicates a potential imbalance in eye positioning muscles. If both the lateral Phoria test and fusion test are failed, a professional eye examination is recommended.
- (4) Horizontal field: If the subject cannot recognize the L.E.D. target at 70° on both sides, refer for professional consultation if job safety requires good peripheral vision.

Referred Yes No By _____ Notified Examined Rechecked

SNELLEN EQUIVALENTS

20/20 = 6/6
20/25 = 6/7.5
20/30 = 6/9
20/40 = 6/12
20/50 = 6/15
20/60 = 6/18
20/70 = 6/21
20/100 = 6/30
20/200 = 6/60

NEAR VISION EQUIVALENTS

20/20 = N.4 / J.1
20/25 = N.5 / J.2
20/30 = N.6 / J.4
20/40 = N.8 / J.6
20/50 = N.10 / J.8
20/60 = N.12 / J.10
20/70 = N.14 / J.12
20/100 = N.18 / J.14
20/200 = N.36



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