

# Instruction Manual

## Employee Vision Screening



**KEYSTONE  
VIEW COMPANY**

# *Contents*

<b>Introduction</b> .....	1
<b>The Vision Screening Test Set</b> .....	2
The Telebinocular.....	2
The Perimeter.....	3
The Telebinocular Test Targets.....	3
The Record Form.....	5
The Referral Form.....	5
<b>Preparation for Testing</b> .....	6
Test for the Telebinocular.....	6
Perimeter Test.....	6
<b>Test Administration</b> .....	7
Test Procedure: Rapid Screening Tests.....	8
Test Procedure: Comprehensive Test Battery (OVS).....	9
Test Procedure: Perimeter.....	13
<b>Interpreting Test Results</b> .....	14
Stereoscopic (Telebinocular) Tests.....	14
Perimeter Tests.....	14
<b>Special Supplemental Acuity Tests</b> .....	15
<b>Glossary</b> .....	16
<b>Summary of Test Questions</b> .....	17

No skill is so important to the individual as the skill of vision: For learning, for driving, for entertainment, for safety, and for satisfactory job performance.

Yet poor eyesight handicaps one out of three workers in America today. And handicaps their employers, too.

Surveys show that from 30% to 40% of all employees have vision problems; Problems that can cause accidents, lowered morale, serious losses in production, and increased spoilage and waste.

What is unfortunate is that such losses are actually unnecessary. Most visual defects are correctable. Experts agree that 95% of those with deficient sight can attain adequate vision for the job by obtaining professional vision care when needed.

### **The problem faced by industry**

The big problem industry face is how to spot worker visual deficiencies quickly...so corrections can be made.

Even when firms requires physical examinations that include vision screening, the vision tests are too often limited to a simple acuity check with a wall chart. And such tests, as often as not, fail to uncover meaningful visual defects.

An individual may be found to have 20/20 sight...yet still not have adequate skills for reading an invoice, a ledger sheet, or a micrometer gauge!

The American Optometric Association says: "The limitations" of the Snellen chart at 20 feet...are now well known." This is why the Keystone employee vision-screening program was developed. Unlike the Snellen wall-chart tests, Keystone tests are binocular: The method recommended by the American Optometric Association.

### **How Keystone screening can help**

Keystone test measure ten basic visual skills required by the worker, not just visual acuity alone. The tests indicate if the eyes function together as a team, measure eye posture and possible imbalance, and even check such skills as depth perception and color discrimination.

Because the visual process is extremely complex, it is vital to check all the major component skills. Only in this way can a true picture of visual efficiency be determined.

Binocular testing is a significant advantage of the Keystone program. Even those tests designed to check the acuity of one eye are given with both eyes open. They test "usable binocular vision", since this is the manner in which the eyes are used in the employee's everyday environment.

This technique also discloses if there is suppression (or blocking of vision) in one eye...a condition, which cannot be detected when one eye is occluded during testing.

### **General test procedure**

Keystone vision screening tests are easy to administer. The test subject is seated in front of a Keystone Telebinocular test instrument. He/she looks into the instrument and views a series of stereoscopic test targets slides. The examiner explains each target and the subject reports what he/she sees. His/her responses are checked on a record form.

Testing is rapid. The comprehensive test battery included in the basic set can be administered in four to five minutes. Four rapid screening tests save additional time...can be given in two minutes or less.

### **Near-point and far-point information**

Keystone screening tests measures visual skills at both far point and near point. "Far point:", sometimes indicated by the symbols "8", is the equivalent of an actual distance of twenty feet. "Near point" is the equivalent of sixteen inches...and is often referred to as "reading distance".

The Keystone Telebinocular produces both distances optically by means of lenses and precision-scaled target slides. This not only conserves space, but makes Keystone tests particularly valuable in checking the vision of individuals who are required to make a heavy demand on their eyes in reading at near point.

### **Test significance**

Please bear in mind that the Keystone tests are designed for screening-out purpose only: To quickly indicate if an individual's vision falls within accepted norms of good seeing...or if he/she is penalized by deficiencies where corrective action should be taken.

Keystone employee vision screening tests are not intended to provide detailed diagnostic data. They should not be compared test-by-test with clinical findings in an ophthalmologist or optometrist's office.

Yet they are accurate and dependable. All tests are objective and all are given under standardized conditions. Overall results shows very high validity. In fact, the tests are so reliable that thousands of vision specialists use them to assist in their diagnoses. And the tests are accepted and approved by leading professional organizations.

## **THE VISION SCREENING TEST SET**

The complete Keystone industrial vision screening Test Series provides all the material required for a comprehensive and reliable measurements of an employee's visual efficiency. In all, ten major visual skills are measured...most at both near point and distance.

The Test Set includes: A Telebinocular instrument with occluders, a dust cover, and one extra lamp; two Industrial Rapid Screening Test targets; a Comprehensive Test Battery of fifteen target slides; three Special Acuity targets for measuring usable vision at extra-close and intermediate distances; the Keystone Perimeter attachment for the Telebinocular; two pointers; and 500 record forms.

### *THE TELEBINOCULAR*

The Keystone Telebinocular is the accepted pioneer of modern binocular vision testing instruments. The latest industrial model Telebinocular has been re-designed to meet the special needs of bifocal wearers. Completely self-contained, it is unusually easy to use. Because it weighs less than fourteen pound, it can be easily carried to any convenient location. And it requires just than one square foot of desk or table or table area wherever it is used.

**Carrying handle**-Makes moving the Telebinocular easy. Retracts into the viewing head when not in use.

**Headrest**-The tester's forehead should rest lightly against this specially designed strip. Disposable tissue headrest cushions are available as a sanitary accessory.

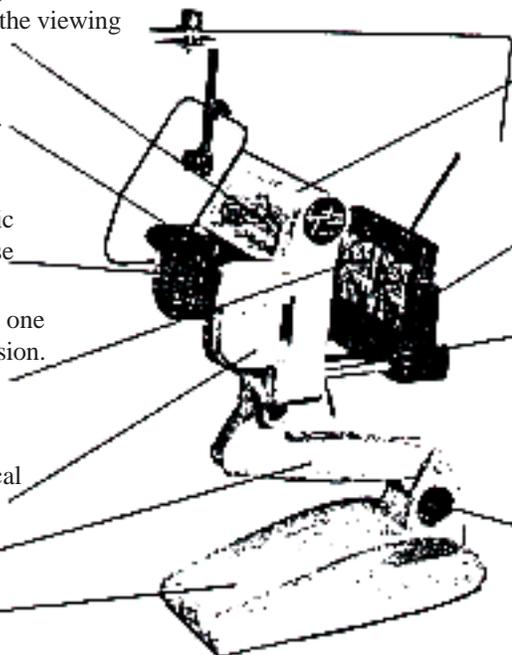
**Professional-quality lens system**-Achromatic prism lenses are accurately positioned for use by anyone without adjustment.

**Occluders (one on each side)**-Permits testing one eye at a time to check the possibility of suppression. (See the discussion below.)

**Viewing head**-Tilts backward from near-vertical through about 27° to aid bifocal wearers.

**Support arm**

**Base**



**Light**-Lamp at top of the viewing head provides even non-glare illumination of targets. Uses standard-type bulbs, operates on regular 110-120 volts a/c current.

**Card holder**-Accommodates twenty tests targets, locks in place to prevent spillage during testing. Open design allows the use of a pointer from the top or sides.

**Test distances pre-calibrated**- All are produced by optical means. A scale indicates distances of 10", 13" 16" (standard near point), 26", 40", and 20 feet (standard far point). Adjustable locking devices on the twin shaft supporting the cardholder aid in marking the normal near-point position.

**Locking knob**-Prevents the viewing head from moving vertically during the tests. (Head height adjusts through a 6 1/2 inch range).

## How and why the occluders are used

The Telebinocular includes two occluders (one for each eye) so monocular (single-eye) testing can be done, if desired.

The occluders are wing-like plastic plates that pivot up and down at the rear of the viewing head. To block the vision of either eye, simply push down on the projecting tip of the appropriate occluder. (In normal binocular testing, the tips of the occluders are pushed up as far as they will go.)

A major function of the occluders is determining if visual *suppression* exists. Suppression is the mental blocking out of the image seen by one eye, so that the only image that registers in the brain is the one seen by the other eye. Normally, the separate images seen by the two eyes are fused into a single, integrated image in the brain.

Because Keystone tests requires the use of both eyes together, suppressions will become evident when the acuity tests of the Rapid Screening targets and/or Tests 5,6,14, and 15 of the Comprehensive Battery are given. The signal indicating possible suppression is a report by the tester that the image, which should be visible to one eye, does not appear.

In such cases, use an occluder to block the vision of the *opposite* eye. This usually stimulates the "non-seeing" eye to work hard enough so the "missing" image becomes visible. If this does not happen, it may be concluded that all functions vision has been lost in that eye.

The occluders are also used when the Snellen (wall-chart) equivalents of (Comprehensive Battery) Usable Vision Test 4,5,6,13,14, and 15 are desired. These equivalents are valid *only* if one eye is occluded during testing.

## Telebinocular maintenance

Under normal conditions of use, the Telebinocular needs no maintenance except for the occasional replacement of the lamp bulb. To minimize cleaning, the instrument should be protected by the dust cover when not in use.

Periodically, however, some cleaning will be necessary. The body of the Telebinocular should be dusted from time to time with a soft cloth or brush...and the lenses cleaned with lens cloth or tissue. If the unit has become very soiled, it may be washed with a mild soap-and-water solution.

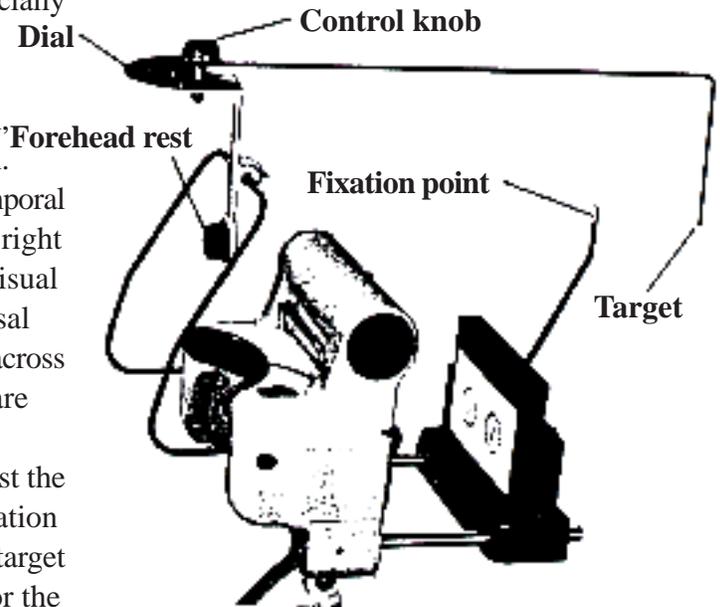
## THE PERIOMETER

This unique device is used to measure lateral peripheral (side) fields of vision. It will indicate if an employee is handicapped by "tunnel vision", making it especially useful in testing drivers, crane operators, etc.

The unit attaches easily to the viewing head of the Telebinocular with two thumbscrews. Thanks to its design, it needs not to be removed when stereo target tests are given.

Both nasal and temporal reading may be taken. A temporal reading measures peripheral vision to the outside: For the right eye, for instance, it indicates how far to the right his/her visual field extends when the subject looks straight ahead. A nasal reading measures the width of the visual field to the inside...across the nose. Most employee vision screening examinations are limited to temporal readings.

In testing, the subject places his/her forehead against the unit's forehead rest and fixes his/her eyes on the white fixation point above and behind the Telebinocular cardholder. The target is swung from behind the subject's head around one side or the other until its presence is noted.



## THE TEST TARGETS

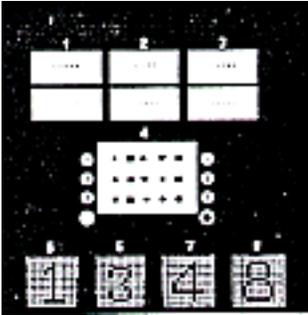
Keystone vision screening test targets are photographically precise stereoscopic slides. Many are three-dimensional. Each one presents somewhat differing images to the two eyes: The eyes must work together to fuse-merge-both images to a single image, as shown in the illustration below. All tests are psychologically sound and scientifically correct.

Keystone targets are lightweight, yet sturdy. Virtually unbreakable in normal use, they resist fading and withstand rough handling. Should any targets be lost, damaged, or destroyed, individual replacement can be supplied.

Information to aid in administering and interpreting the tests will be found on the back of most target cards.

## RAPID SCREENING TESTS

This two-target set is designed to save examining time. It checks four visual skills on a rapid *elimination* basis. Persons who pass the test may be considered to have at least satisfactory vision. Failure on any of these tests, however, indicates the need to administer the Comprehensive Test Battery (next page). Some individuals may fail the Rapid Tests but, because of the more deliberative process, achieve satisfactory scores on the standard battery.



**Far Point Target-** Three visual skills are checked: Blocks 1-3 measure acuity of the eyes separately and together at the 20/40 and 20/30 levels. Block 4 tests minimum depth perception ability. And the remaining four blocks indicate gross color discrimination skill.



**Near Point Target-**Snellen letters are used to measure acuity in steps from 20/100 to 20/20. Blocks 1-6 at the top check the eyes individually and together. Block 7 provides a quick check of the eyes together, indicates acuity of 20/40 to 20/20, can be given in 10 seconds.

### SPECIAL ACUITY TESTS

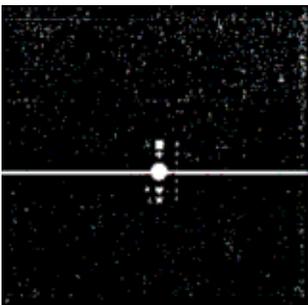
These three target slides are designed to measure the acuity of person who must work at unusually close distance...or who must maintain sharp vision at a distance of from 20 to 30 inches. The tests are given at the optical equivalent of 10,13, and 26 inches. Target illuminations and discussions of each of the tests will be found on page 15 of this manual.

### COMPREHENSIVE TEST BATTERY

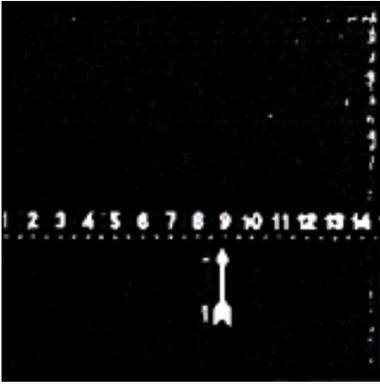
The fifteen test targets, which comprise this battery, have been popular with industry for more than thirty years. Very similar to tests regularly used by vision specialist to aid diagnosis, these screening tests provide a detailed analysis of ten visual skills considered essential to satisfactory job performance in nearly every area.

The complete Test Battery requires less than five minutes to administer, which can save considerable employee time off the job. Yet there is no company-administered vision screening test series on the market today, which is more complete, more reliable, or more widely accepted!

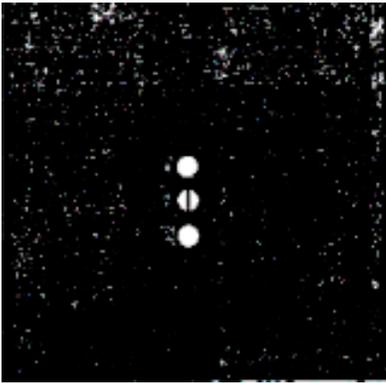
The results of the fifteen tests should not be considered separately, but as a whole. Information to aid in interpreting test results will be found on page 14. The battery is of particular value when used with person involved with job transfer situations and with industrial accidents.



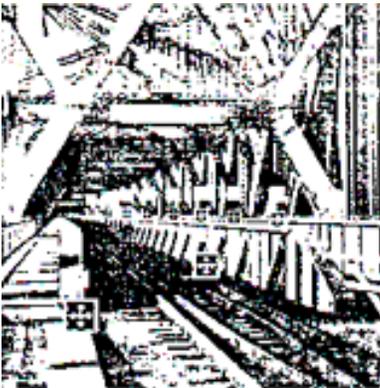
**Test 1: Vertical Balance-** This target check the relative vertical posture of the eyes at far point, shows if an imbalance exists. If the line does not pass through the ball, the tendency of one of the eyes to turn upward is indicated.



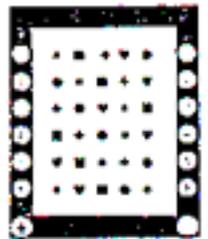
**Test 2: Lateral Balance-** Is vision impeded by an inward or outward deviation of the eyes? This target checks lateral imbalance at far point: The arrow (seen by the left eye) should point between the numbers 6 1/2 and 11 1/2 (seen by the right eye).



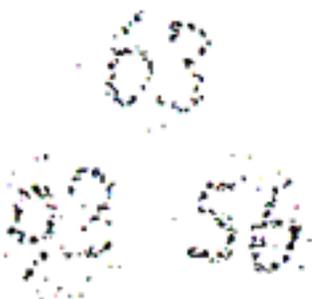
**Test 3: Far-Point Fusion-** This target checks a basic of visual efficiency: Whether the images seen by the two eyes fuse into a single, integrated image. Two balls are presented to each eye; they should fuse into three, as illustrated.



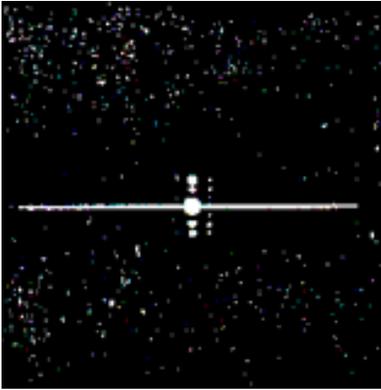
**Test 4,5,6: Distant Usable Vision-** Three similar 3-dimensional targets test the acuity of the eyes separately and together. The test subject is required to locate black dots in each of then signboards suspended along the bridge.



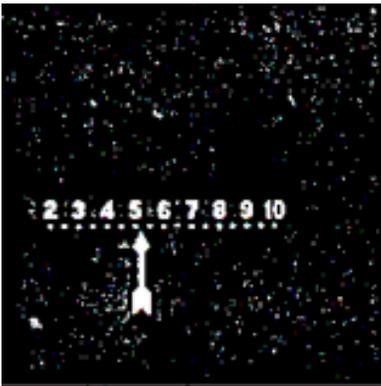
**Test 7: Depth Perception-** This three-dimensional target measure stereopsis-depth perception due solely to the coordinated use of the eyes-at far point. The tester must name the symbol on each line that stands out from the others.



**Test 8,9: Color Vision-**Two far-point targets present three red/green and three blue/violet symbols. Presence of normal color vision- or severe or mild color blindness-is shown by the tester' ability to identify number in each symbols.



**Test 10: Vertical Balance**-Similar to Test 1, this target checks the vertical posture of the eyes at near point (normal reading distance). The horizontal line should pass through the ball, as in the previous test.

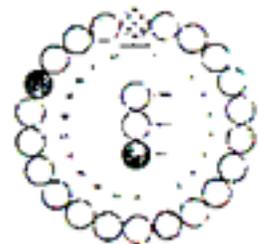


**Test 11: Near-Point Lateral Balance**- Inward or outward eye deviation at reading distance will be shown by this target (similar to Test 2). An arrow is presented to the left eye, numbers to the right. The arrow should point between 3 1/2 and 7.



**Test 12: Near-Point Fusion**- This target measures the tester's fusion ability at reading distance. It is very similar to Test 3, described above. Two colored balls are presented to each eye. They should be seen as illustrated. As three balls in a line.

**Test 13, 14, 15: Usable Vision at Near**- Three similar targets provides reliable non-letter tests, easily understood by the poorly-educated, to measure the visual acuity of each eye and both eyes together...with both eyes open and seeing.



## THE RECORD FORM

The Keystone's "self-scoring" form simplifies record keeping. The examiner needs only to check the test subject's responses to provide a detailed record of his/her visual abilities.

On the *left* side of the form are spaces for noting the results of the Rapid Screening Test and the Perimeter peripheral vision tests.

The Perimeter tests are recorded as described on page 13. (Three readings are normally taken for each eye and the results averaged before the score is noted.)

The *right* side of the form provides an area for recording the results of the fifteen Comprehensive Battery tests (preceding page). This section is divided into white, light gray, and dark gray areas to aid test interpretation.

Test results checked in the *white* column indicate satisfactory performance. Checks in the *light gray* areas indicate the need for a recheck.

Checks in the dark gray area report possible vision handicapped and the probability that an eye specialist should examine the employee. (Please note: Each company according to its need and structure should determine referral policy. The Keystone tests only determine if an employee "see" within accepted norms.)

Instructions for filling out the record form are given in the sections, "Test Administration" and "Perimeter Tests".

In many cases, a company will wish that the employee be given a copy of his/her test results. This can easily be accomplished as follows: Insert a sheet of *pencil* carbon paper between two copies of the form. Use a ballpoint pen or hard lead (No.3 or harder) pencil when filling out the top copy (company copy) of the form.

The record form is supplied in pads of 100 sheets each.

*\* When retesting is indicated, the employee should not be rechecked immediately, but sometime within a two-week period. If most scores indicate satisfactory visual skills, you may retest the worker only in those areas checked as "Retest". If a number of scores were checked in both the light gray and dark gray column, the entire battery of tests should be administered. Please remember that variations in an individual's psychological and physiological make-up can affect his/her test scores. Please refer also to page 14 of this manual for information concerning the need for retests.*

## *THE REFERRAL FORM*

If the employee should indicate visual deficiencies, which might affect his/her job performance or safety, this optional form, will provide information of values to the vision specialist, which he/she may consult.

The form summarizes various data about the employee's job vision needs. For maximum value to the vision specialists consulted, a carbon copy of the test record form should accompany it. (Refer to the paragraphs above.)

The form is offered in pads of 100 sheets each. **Catalog Number 5519.**

## **PREPARATION FOR TESTING**

### *TESTS FOR THE TELEBINOCULAR*

#### **Readiness of the equipment**

Normally, the Telebinocular should be placed on a desk or table providing sufficient room for the instrument, any accessories to be used, and the record form. A table height of from 26 to 30 inches is recommended.

Place the Telebinocular near the edge of the table...and be sure that adequate knee room beneath the table is provided for the test subject. Chairs for both the tester and the examiner should be straight-backed.

Before testing begins, check the Telebinocular to make sure it is in proper working order. The unit should be connected to a standard 110-120 volt a/c outlet and the lamp should light when the switch is turned on. (If necessary, the instrument should be dusted and the lenses cleaned with a soft lens tissue. And the headrest tissues, if used, should be fresh.)

In addition, check the test targets in cardholder. The targets should be in proper sequence and the back plate of the cardholder moved far enough to keep the targets upright but not too tight to prevent easy change.

#### **General test conditions**

Whenever possible, Keystone vision screening tests should be given in a reasonably quiet room away from direct sunlight. Test can be performed in virtually any area where traffic, noise, glare, or interruptions do not disconcert either the tester or the examiner...and do not interfere with the accuracy or speed of the tests. If testing is done in a large, open office area, the Telebinocular should be located in a quiet corner.

Employees should be admitted to the testing area one at a time. This will prevent person waiting to take the tests from obtaining erroneous or advance information concerning responses..., which could affect test validity. Although only the test subject can see Keystone tests, oral remarks by a tester may be overheard and incorrectly interpreted by others.

The examiner should be seated along the side of the table, facing the test subject. It is important that the examiner be able to see and manipulate the targets in the cardholder. (Remember, too, to provide sufficient table space in front of the examiner for the record form.)

#### **The test subject's posture**

Good body posture is important to good vision. So it is vital that proper posture be maintained during testing. An uncomfortable position will cause strain and distract the tester.

Seat the test subject in front of the Telebinocular and close enough to it so that his/her back and head are effect his/her shoulders level, but relaxed. His/her feet should either be flat on the floor or comfortably placed on a rung on his/her chair.

Adjust the height of the Telebinocular viewing head so the desired posture can be maintained throughout

testing. It may be necessary to loosen the block knob at the back of the support arm so the viewing head will move smoothly. (The knob should be tightened to "lock" the instrument when the most satisfactory position has been determined.)

The tester's forehead should rest lightly upon the Telebinocular headrest and this position should be maintained throughout the test period. Do not allow the employee to pull back or away from the instrument between individual tests. And caution him/her from tilting the headrest at any time.

### **If the test subject wear glasses**

If the tester wears glasses, the test should be administered with the glasses on as usual. In the case of glasses worn only for reading or only for distance vision, they should be removed when testing that type of vision for which they were not prescribed.

If the tester wear bifocals, certain instrument adjustments may be necessary. It is important that both the Telebinocular and the glasses be adjusted so the tester's line of vision may pass unobstructed through the bottom of the bifocal segment for all *near-point tests*.

Also exercise caution when testing an employee who has recently been 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 progress. Poor scores on the Keystone tests shortly after such a fitting, therefore, may not be truly significant. A retest after approximately two months is recommended.

## *PERIOMETER TESTS*

If the Perimeter is attached to the Telebinocular\*, lower the height of the Telebinocular instrument so the test subject's forehead lightly touches the *Perimeter forehead rest*. The test subject should observe the rules of posture outlined above.

The examiner should *stand* in front of the instrument, facing the tester. The tester is directed to fix his/her eyes on the Perimeter fixation point. The examiner should carefully watch the tester's eyes to make sure that fixation is not broken during the testing. And the examiner should firmly grasp the control knob so the target can be turned without arm movement clues being given to the test subject.

*\*As an accessory item, the Perimeter may be mounted its own adjustable pedestal stand. If you have one of these Perimeter mountings, the only pre-test preparations necessary are:*

- 1. Position the unit on a table or desk in accordance with Telebinocular instructions above.*
- 2. Adjust the height of the unit to that of the test subjects, so that the forehead rest lightly touches the upper forehead while the tester sits erectly.*

## *TEST ADMINISTRATION*

When Keystone vision screening tests are administered, it is important that an organized procedure be followed...and that standardized questions be used. Only in this way can consistent results be assured. The sequence of the tests and the instructions given the tester can both affect his/her responses.

The questions listed for each test, beginning on page 8, have been found to evoke a quick response from the average test subject. However, as the individual examiner becomes experienced in administering tests, he/she

may wish to adapt the specific wording of each question to suit his/her own style.

Responses should be prompt. After each question is asked, allow five to ten seconds for the test subject to become oriented to the target scene and report what he/she sees. An obvious hesitation indicates an effort to guess. There is no "penalty" for reporting an "incorrect" answer, so encourage the tester to be as frank as possible in telling what he/she really sees.

It is well to acknowledge each response the subject gives...but be careful not to indicate approval or disapproval, praise or chastisement. And do not "lead" the test subject into giving the type of response you wish.

Keeping the amount of conversation during testing to a minimum will also help preserve the objectivity of the tests and will serve to save time for the examiner.

### **Recording the findings**

Speed of recording will depend entirely on the examiner's familiarity with test targets and the record form. The form is carefully designed to show both expected and abnormal responses, so that scoring can be done by simply checking the appropriate space.

The Comprehensive Battery usually requires about four minutes to administer. If undesirable visual characteristics are noted, responses will usually be slower and the examiner should allow more time. But even in such cases, the complete examination should take no more than seven to eight minutes.

### **Help the employee give his/her best performance**

The visual skills rating of any individual can be altered by the attitude of the examiner. It should be the examiner's purpose to evoke the best performance the employee is capable of giving.

It is assumed that in normal living, the employee makes the best possible use of his/her visual skills and does not live under the handicap of his/her worst moment. Thus, when he/her see four balls on Test 4, when he/she should see three, give him/her the opportunity for the two white balls to soon merge into one.

Similarly, if he/she misses the position of the dot on the fourth signboard in Test 5-but correctly notes its position on the next two signboards-go back to the fourth one and give him/her a second chance.

### **Using a pointer**

It is often advisable to use a pointer to aid in explaining test targets, particularly with uneducated persons. Pointers can be especially helpful in tests of acuity (useable vision).

Always point from the top of the test target. And, to determine where the left-eye image is seen in relation to the right-eye image, point always on the right side of the target.

*Please note:* Pointers are supplied with the Test Set. Never use a ballpoint as a pointer: It can permanently mark a target with one slip of the examiner's wrist. A knitting needle would be preferable.

### **Handling test targets**

Targets are normally left in the Telebinocular cardholder between the testing of different persons. Targets should always be upright, but not held so tightly they cannot be easily slipped out of the cardholder. (The movable plate at the rear of the cardholder can be easily adjusted to provide the correct degree of "tightness".)

At the completion of each specific test, slide the target up and out of the cardholder and insert it at the rear of the "deck" of target slides. This keeps the target in proper sequence at all times.

**Complete the identification section of the record form**

The top right section of the record form provides space for noting employee identification data. Be sure the basic data is filled in before actual testing begins. When many workers are to be tested in one session, it may be preferable to have as much data as possible pre-recorded.

The information on whether the individual wears glasses is obtained at the time of testing. Glasses should be worn during the tests exactly as they are normally worn: If the prescription is worn all the time, both near-and far point testing is done with glasses.

When the glasses are worn only for reading, or only for seeing at a distance, they should be used only for the appropriate section of the tests.

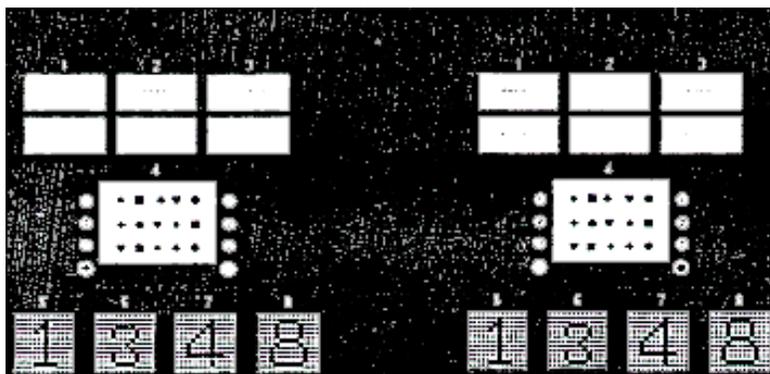
Should you desire the Snellen equivalent value for each score on the Comprehensive Battery acuity tests, the Telebinocular occluders must be used when administering Test 5,6,14, and 15. (The equivalent values are listed on page 13.)

**TEST PROCEDURE: INDUSTRIAL RAPID SCREENING TESTS**

The test subject is seated before the Telebinocular, following the rules of posture listed on page 6. Tests are given with glasses worn as usual: For distance vision only, near point work only, or both. The first target is used at *far point*: This is shown by the 20-foot marking on the calibrated scale. The second target is used at *near point*...the 16 inch marking on the scale.

**Set the Telebinocular card holder at far point (20 feet)**

*Target 1*



**Part A-Distance Acuity (Blocks 1,2,3)**

*Question:* "In blocks 1,2, and 3, at the top of this slide are a series of letter. Let's start with column one. s What letters do you see in the upper part of the block? What letter do you see in the lower part? (Continue with the upper and lower blocks in columns two and three.)"

*Response:* The test subject should read at least four letters correctly in each block.

*Recording:* If less than four letters are read

correctly, indicates Fail for that block.

*Remarks:* Letters in the top blocks indicates 20/40 acuity. Letters in the lower backs indicate 20/30. Column 1 checks the right eye; column 2 checks the left; and column 3 checks both eyes together. If any block is failed-or if the subject is unable to distinguish the blocks-stop the test and refer immediately to the Comprehensive Battery.

## Part B-Stereopsis (Block 4)

*Question:* "In block number 4 (indicate with pointer) are three rows (lines) of symbols numbered 1,2, and 3. In the top row, do you see a star, a square, a cross, a heart, and a ball? Does one of the symbols in this line seem to float out in the air...closer to you than the others? Which one? On the second line, which one floats out closets? On the third line?"

*Response:* If the subject cannot tell which symbol stand out in any line, place your pointer slightly above the cross in line one and move it toward the subject. Ask: "Now do you see the cross standing out?" if this still produces a negative response, ask if the subject can see both the cross and the ball at the lower corners of the block. If only one is seen, suppression is present. If both are seen, but no symbol above seems to stand out, there is a total lack of stereopsis.

*Remarks:* This test shows the individual's ability to note the relative location of objects in space using binocular vision clues. It does not indicate his/her distance judgment. A one-eyed person may have some distance judgment in a situation he/she knows well. He/she does not have stereopsis. The value of the skills is that it enables an individual to judge relative distances in unfamiliar situations and where the size and shape of objects being judged is unknown.

## Part C-Color Perception (Blocks 5-8)

*Question:* "What numbers do you see in each of the four blocks at the bottom of the card?" (**A pointer may be used if desired.**)

*Response:* The expected responses are: 1,3,4, and 8.

*Remarks:* If all blocks are failed, the subject is colorblind. If blocks 5 and 6 are passed, but 7 and 8 are failed, the subject is color deficient...and should be checked with the color vision tests of the Comprehensive Battery.

### Set the Telebinocular card holder at near point (16 inches)

#### *Target 2 - Near-Point Acuity*

*Procedure:* If an employee's work is mainly at far point-and the near-point test is given only to insure that he/she can see at near, testing can be limited to having the individual read the paragraph in block 7. However, if near vision is important to the employee' assignment, each eye should be tested using the blocks of letters (lines 1-6).



#### *Paragraph Reading*

Have the subject read the statement in block 7. The top line is the equivalent of 20/40 visions; the centerline is equivalent to 20/30; and the bottom line is equivalent to 20/20. All three lines require use of the eyes together.

#### *Snellen Letter Blocks*

Beginning with column A, have the subject read the letters in each line from 1 through 6. Then have him/her read the letters in each block in each of the two other two columns. Place a check on the record form to indicate

each block correctly read. (At least four letters should be identified in each block from line 2 through 6.) Note: The Snellen acuity values are given are valid only if the eye opposite that being tested is occluded.

## TEST PROCEDURE: THE COMPREHENSIVE BATTERY

Seat the test subject before the Telebinocular and follow the rules of posture listed on page 6. Administer the tests with glasses worn by the subject as usual: For distance vision only, for close work only, or both.

### FAR-POINT TESTS

Set the cardholder at the far-point position (shown as "20 feet" on the scale). Be sure bifocal wearers are looking through the *upper* segments of their lenses.

#### Test 1-Far-point Vertical Balance



*Question:* "Do you see a yellow line? Do you see a group of red symbols? Through which of the symbols does the yellow line pass?"

*Response:* The expected answer is, "Through the red ball."

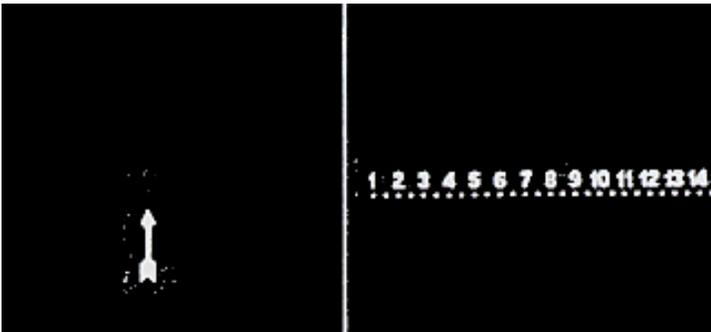
*Recording:* Check the appropriate space on the record form to show exactly what the tester reports: The line passes through the ball, just above it, through the star, etc. if only the line or only the symbols are seen, one eye is not functioning...due either to suppression or the

complete lack of usable vision.

*Remarks:* If there is any doubt implied in the tester's response, move the pointer vertically along the row of symbols and say, "Tell me to stop when the pointer touches the yellow line." The subject may report that the line seems to break before and after it passes through a symbol. This is not important. However, a decided head tilt is important...and can significantly affect the finding. Be sure proper posture is maintained.

If the line is not reported to pass through the ball when glasses are worn, test the subject a second time without glasses. If, on the retest, the line passes correctly through the ball, the probable cause of the discrepancy is bent eyeglass frames. Recommend to the employee that he/she have an optician check the spectacles soon.

#### Test 2-Far-Point Lateral Balance



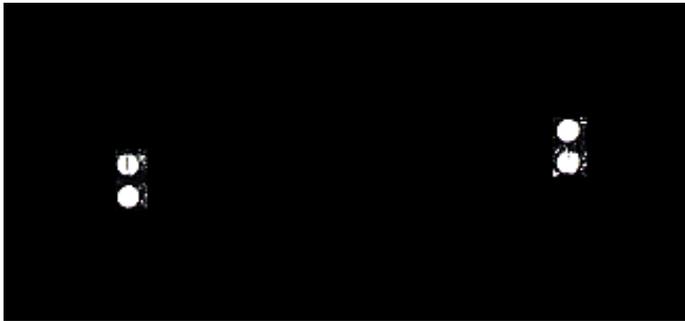
*Question:* "To which number-or between which numbers-does the arrow points?"

*Response:* The apparent movement of the arrow may delay response. To assist in speeding response, ask for a number within the range of movement. When this has been obtained, then determine how far each way the movement continues.

*Recording:* Check the number to which the arrow points.

If the arrow fluctuates, draw a line between the two numbers between which it moves. If the arrow continues moving in one direction, wait until it stops before checking the appropriate number.

### Test 3-Far-Point Fusion



*Question:* "How many balls do you see?"

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

*Recording:* Check the number of balls seen, according to the diagrams on the record form.

*Remarks:* If only two balls are seen (which is highly unlikely), determine by their color whether the right or left eye sees them. (The blue ball is seen by the left eye only.) If four

balls are seen-either initially or after a few seconds-determines if the blue ball is to the left or right of the red one. And also determine if the two sets of balls are relatively close or far apart.

### Test 4-Far-Point Usable Vision: Both Eyes



*Question:* "Here a railroad bridge. On the bridge is a series of ten signboards. The first one is largest and closest to you; the others are smaller and farther away. Look at the first signboard. (Use a pointer.) There are five white diamond shapes in it. In one of the diamond is a black dot. On the first signboard, where do you see the dot: Top, bottom, right, left, or center? (Obtain response.) Where is the dot on the second signboard? Where is it on the third?" Etc.

*Response:* Responses should be prompt. If the test subject hesitates, indicating an effort to guess, the last previous responses should be checked as final.

*Recording:* Check the last correct response before two successive failures. Example: If the subject correctly locates the dot on signboard 6 but misses 7 and 8, check 6 as his score.

If the subject miscalls one signboard but continues and calls the next one or two correctly, give him/her a second chance to pass the miscalled test. Continue for two signboards past the error, then return to the board just before the one miscalled and retest from that point.

If the error is corrected on the retest, continue testing. If it is not corrected, discontinue the test and check the number before the original error.

*Remarks:* When the test subject states he/has reached the limit of his/her discrimination, it is well to encourage him/her to try the next signboard. If the score is lower on this test than on Test 5 or 6, some difficulty in binocular seeing is indicated.

### Test 5-Far-Point Usable Vision: Right Eye



*Question:* "Now let's repeat this kind of test. The only thing that has changed is that the dots will be in different diamonds. Where is the dot on signboard 1? In number 2?" (Continue as in Test 4)

*Recording:* Follow the same procedures as for Test 4.

*Remarks:* The subject will not usually realize that this is a test of acuity of one eye only and that only the right eye sees the dots. Exercise caution that he/she does not learn this.

If the subject cannot locate the dot on the first signboard, he/she is totally suppressing in the right eye. You then check the No Dots Seen space on the record form.

Should this be the case, if the subject cannot locate the dot on at least signboard 4, occlude the left eye and continue from the last signboard correctly called. Check the last board called correctly without the occluder...and circle the last correct answer made with the occluder.

This occlusion finding, if beyond the first reading, will indicate a definite suppression which appears at a specific point of difficulty due to the progressive reduction in the size of the signboards. This occlusion finding will also approximate the tester's Snellen acuity score, which is always determined with the non-tested eye occluded. The existence of suppression is important because it reliably indicate some other binocular vision problem. When a certain stress level is reached in the lack of binocular coordination, one eye simply lets the other work alone and with comfort.

### Test 6-Far-Point Usable Vision: Left Eye

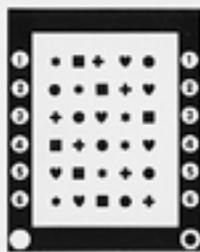
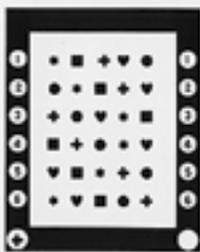


*Procedure:* Follow the same procedures as for Test 5.

*Remarks:* If the tester, without occlusion, goes at least to signboard 6 on the previous test, it is feasible to begin this test as the fourth signboard.

Please refer to page 13 for the Snellen (wall-chart) equivalents of Tests 4,5, and 6.

### Test 7-Far-Point Depth Perception



*Question:* "On this card are six rows of symbols inside a black frame. Each row has five different symbols. In the first row-at the top-are a star, a box, a cross, a heart, and a ball. (Use a pointer if necessary). Does one of the symbols in this row seem to float out in the air...closer to you than the others? Which one? In the second row, which one

floats out closer?" Etc.

*Response:* The normal response is to correctly report at least five lines. If the test subject does not report the cross as "floating out" toward him/her in the first row, it may be necessary to rephrase the question for better understanding. If this still produces a negative response, ask if the tester can see both the cross and the ball in the lower corners of the frame. If only one is seen, suppression is present. If both are seen, but none of the symbols above appear to stand out from the target, there is a total lack of stereopsis.

*Recording:* Place a check mark on the last symbol which is correctly reported.

*Remarks:* The percentage of stereopsis represented by the various rows on this test is: (1)-10%; (2)-20%; (3)-30%; (4)-40%; (5)-50%; (6)-60%. Stereopsis is particularly important to industrial workers who operate moving machinery.

### Test 8-Far-Point Color Vision (Red/Green)



*Question:* "What is the number you see in the top ball? In the lower left ball? In the lower right ball? (Use a pointer if necessary.)"

*Response:* Correctly naming both digits on two balls is the minimum acceptable answer. Even this indicates some possible degree of color blindness.

*Recording:* Check the number of balls on which both

digits are correctly identified.

*Remarks:* If the test subject will be more comfortable, this test and the next (No.9) may be administered with the Telebinocular cardholder moved up the shaft toward near point. After you have given your instructions, do not permit the subject to study the target or to delay too long. Failure of this test indicates severe color blindness.

### Test 9-Far-Point Color Vision (Blue/Violet)



*Procedure:* Follow the same procedures as for Test 8. Failure of this test indicates a mild color blindness.

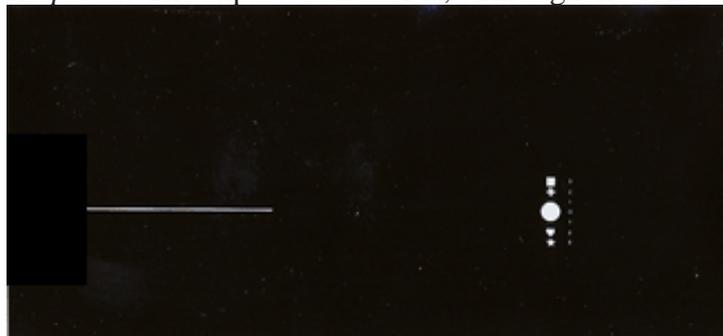
### *NEAR-POINT TESTS*

Set the Telebinocular cardholder at the near-point position (shown as "16 inches" on the scale). If the test subject wears bifocals, it may be necessary to tilt the viewing head of the Telebinocular to insure that he/she is able to view the targets through the lower segments of the lenses. Be sure the rules of posture, outlined on page 6, are maintained

### Test 10-Near-Point Visual Balance

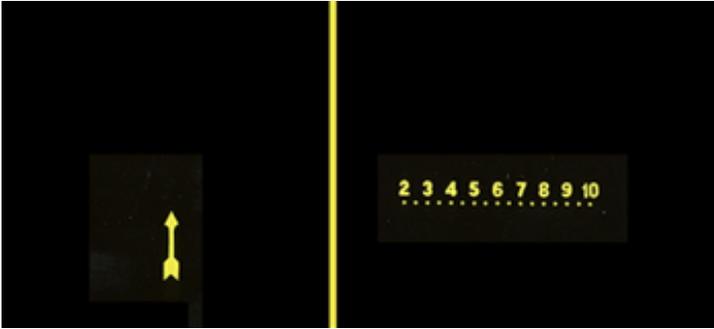
*Question:* "Do you see a yellow horizontal line... and vertical row of red symbols? Through which of the red symbols does the line pass?"

*Response:* The expected answer is, "Through the ball."



*Recording:* Check the appropriate space on the record form to show exactly what the test subject reports.

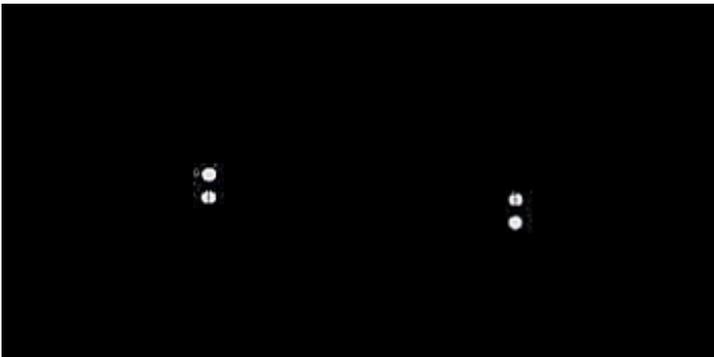
*Remarks:* A person wearing bifocals may show a vertical imbalance at near point but none at far point. Persons who do not wear glasses normally show about the same vertical balance at both distances.



### Test 11-Near-Point Lateral Balance

*Question:* "Do you see an arrow and a row of numbers? To which number-or between which numbers-does the arrow point?"

*Response:* Response may be delayed by the apparent movement of the arrow. To help speed 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 number to which the arrow points. If the arrow fluctuates, draw a line between the two numbers between which it moves. If the arrow continues moving in one direction, wait until it stops before checking the appropriate number.

### Test 12-Near-Point Fusion

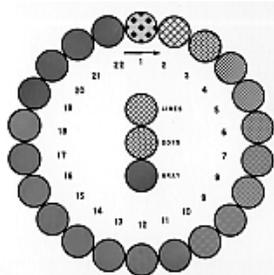
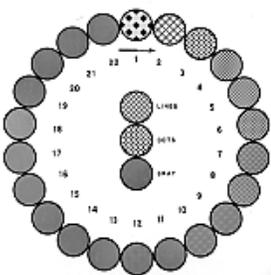
*Question:* "How many balls do you see?"

*Response:* The expected answer is three balls. A

satisfactory answer is four balls becoming three.

*Recording:* Check the number of balls reported according to the diagram on the record form.

*Remarks:* If only two balls are seen (which is unlikely), determine by their color whether the right or left eye sees them. (The blue ball is seen only by the left eye.) if four balls are seen-either initially or after a few seconds-determine if the blue ball is to left or the right of the red one. Also determine if the two sets of balls are relatively close or far apart.



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

### Test 13-Near-Point Usable Vision: Both Eyes

*Question:* "In the center of this slide are three circles. (Use a pointer if necessary.) One has black crossed lines

in it. One has black squares dots in it. And one is solid gray. Around the outside are 22 circles. Each one contains black lines, black dots, or solid gray. The first is black dots. Number 2 is black line. What is number 3? What is number 4?" Etc.

*Response:* Normal response is to correctly identify the pattern present in at least fifteen circles. Do not hurry the test subject, but do not give him/her too much time for study or allow him/her to guess.

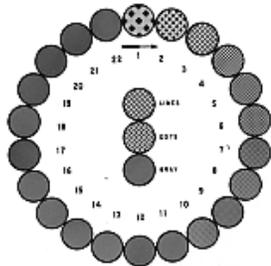
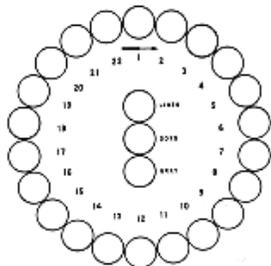
*Recording:* Check the last correct responses before two successive failures. If the subject miscalls one circle but continues and correctly calls the next one or two, retest by going back to the circle before the one missed. If the error is corrected, continue the test. If it is not corrected, check the circle before the original error.

*Remarks:* Be sure the test subject understands the difference between circles containing black lines and circles containing black squares dots. He/she may say "lines" when he/she sees white lines in a black-dot circle.

Emphasize that he/she is looking for *black* lines and *black* dots only.

If the nature of the employee's work is such that only a minimum is done at near point and it *does not make any difference* with which eye the work is seen, Tests 14 and 15 may be eliminated in order to save test time.

But if critical near point seeing is involved in the employee's work, all three near-point usable vision tests should be administered. (The Snellen equivalents of these tests are presented on the next page.)

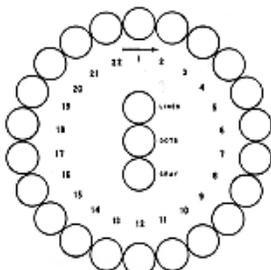
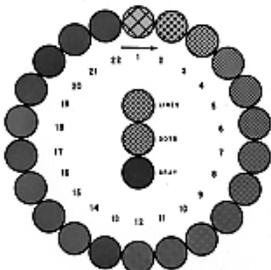


### Test 14-Near-Point Usable Vision: Right Eye

*Procedure:* Follow the same procedures as for Test 13. If the tester correctly identifies the 9th circle on Test 13, it is feasible to try to start him/her on circle 6 on Tests 14 and 15.

*Remarks:* If the subject reports that the line/dot/gray patterns are missing on many or all of the ten peripheral circles, suppression of the eye being tested is indicated. In such cases, use an occluder as discussed in the instructions for Test 5. When an occluder is used, the last correct answer is circled rather than checked.

### Test 15-Near-Point Usable Vision: Left Eye



## SNELLEN EQUIVALENT VALUES FOR KEYSTONE USABLE VISION TESTS

### Tests 5 and 6 (Far Point)

<i>Signboard number:</i>	1	2	3	4	5	6	7	8	9	10
<i>Usable vision:</i>	49%	70%	84%	88%	92%	96%	98%	100%	103%	105%
<i>Snellen equivalent value:</i>	20/100	20/60	20/40	20/32	20/28	20/25	20/22	20/20	20/17	20/15

### Tests 14 and 15 (Near Point)

<i>Circle number on target:</i>	1	2	3	4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19/20	21-22
<i>Usable vision:</i>	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	102%	103%	105%
<i>Snellen equivalent value:</i>	20/200	20/100	20/67	20/56	20/40	20/33	20/28	20/25	20/22	20/20	20/18	20/17	20/15
	(16/160)	(16/80)	(16/53)	(16/45)	(16/32)	(16/26)	(16/22)	(16/20)	(16/18)	(16/16)	(16/14)	(16/13.6)	(16/12)

## *TEST PROCEDURE: PERIOMETER*

Instruct the test subject: "Place your forehead against this rest and look directly at this white button. Do not move your eyes from this point. When you see the target swing into view from either side, say 'Stop' immediately."

Swing the target behind the subject's head, out of range of his/her vision. Then slowly advance the target to the right or left until the subject first detects its presence and says, "Stop". Note the dial reading.

For greater reliability, repeat the procedure until at least three trials have been given for each eye. Average the reading to obtain the subject's score for each eye. If the subject moves his/her eyes from the fixation point during a trial, disregard the reading on the trial.

If a measurement of nasal fields (see page 3) is desired, have the subject hold a card over the eye not being treated. Then swing into his/her line of vision from the nasal side taking the average of three trials.

Test results are recorded on the "dial" reproduced in the upper left corner of the record form.

## *INTERPRETING TEST RESULTS STEREOSCOPIC (TELEBINOCULAR) TESTS*

The purpose of Keystone stereoscopic screening tests is to provide a general picture of an employee's visual efficiency. This information is useful in job application or transfer situations and can indicate if vision is at least partially responsible for possible poor job performance. Discriminate use of the tests in employee placement can assist management in assuring a worker's *achievement and safety* on the job.

The data provided by the tests should be used for visual classification purposes only. The tests are not designed to provide detailed *diagnostic* data. In general test scores should not be considered separately, but as a *whole*. Taken in their entirety, they will almost always provide a reliable indication of an employee's visual efficiency.

### **Record form interpretation aids**

The record form is constructed so that a *visual profile* of employee skills can be easily prepared simply by connecting the check marks showing individual test performance levels. In addition, the form is designed so that if the user wishes to make statistical analyses, scores may be readily translated into digits for computer processing.

In the lower right corner of each block in the score area is a small *value number*. The highest score possible is 75. A score of 70 or *less* generally means an individual has some visual problem requiring attention.

### **Test score significance**

If all of an individual's test scores are recorded in the "*Expected Response*" area of the record form, it may be assumed that he/she has adequate visual skills.

If some scores are marked in the "*Retest*" columns, the employee should not be rechecked immediately but sometime within a two-week period. If most scores indicate satisfactory skills, retesting may be confined to those specific tests where reexamination is indicated. If number skills appear to be "*borderline*", however, the complete battery of 15 tests should be administered.

Any scores in the "*Unsatisfactory*" columns-except as noted below-indicate the probable need for a professional vision examination by an optometrist or ophthalmologist. This is particularly true when the tests show the presence of a visual *suppression*.

The major exceptions to this rule-of-thumb are:

\* **Test 7 (Depth Perception):** This is a highly developed visual skill, subject to maturational factors. Younger employees may do less well than those over 25. The skill is not vital to most clerical positions. However, any worker handling moving machinery or materials should, for safety reasons, score in the "Expected" column.

\* **Test 8 and 9 (Color Vision):** No remedy has yet been perfected for defective color vision. However, for reasons of personal and industrial safety, persons who are colorblind should be made aware of their deficiency.

Unless your company provides the services of a vision specialist, the employee with unsatisfactory visual skills should be requested to consult the specialist of his/her choice. Information to aid the doctor can be provided on the Referral Form described on page 5.

### **Additional aids to test interpretation**

\* **Test 1 and 10 (Vertical Imbalance):** If a definite imbalance is noted, not due to bent eyeglass frames, the tester will have a tendency to see double. At far point, this presents a definite safety hazard; at near, it can adversely affect work performance and quality.

\* **Tests 2 and 3 (Far-Point Lateral Imbalance and Fusion), Tests 11 and 12 (Near-Point Lateral Imbalance and Fusion):** If an individual fails either lateral imbalance test, but quickly and easily notes three balls only on the fusion test which follows immediately, a professional examination may not be required. Such test result would indicate that the individual has become so well adapted to his/her lateral imbalance that it does not interfere with his/her visual functioning.

### **Periodic retesting**

An individual's vision is not static. It changes with time...and can be affected by such factors as age, general health, emotional disturbances, fatigue, and working conditions. Therefore, employee vision should be re-screened at periodic intervals...preferably once a year.

It is also advisable to administer a complete screening test to any individual involved in an industrial accident. This can prove unusually helpful in many cases in determining the cause of the accident.

### *PERIOMETER TESTS*

Periometer tests of lateral peripheral vision are 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 a right angle- to his/her eye on the temporal (outside) side.

No exact standards have been developed which show the point where the diminution of lateral fields has an effect on accidents. However, authorities state that a field more restricted than 60( would be a serious danger to a driver. A temporal reading of 75( should be considered the minimum standard for safety. (The Interstate Commerce Commission requires a lateral field of at least 70( for each eye.)

It is suggested that when a driver shows a very severely restricted field, even though his/her other visual skills are normal, he/she be referred to a vision specialist for examination and professional opinion.

### *SPECIAL SUPPLEMENTAL ACUITY TEST*

These three special tests are designed to measure the acuity of individuals whose job demands call for work at extremely close or intermediate distances. The 10-inch and 13-inch tests are particularly suitable for persons doing fine assembly or other tasks at less than the normal reading distance. The 26-inch test provides a general measure of acuity for persons whose jobs require sharp vision at distances from 20 to 30 inches. (Many

machine operators are in this group.)

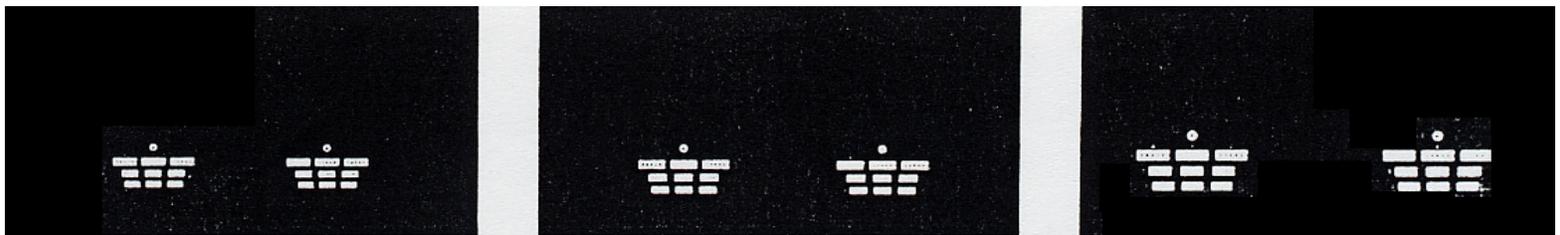
The three test targets are almost identical: Only image size varies from target to target. Each one checks acuity at the 20/70, 20/40, and 20/30 levels. On all targets, boxes in column A check the left eye, boxes in column B check the right eye, and column C boxes test the eyes together.

The letters in each box are the same on each of the three test targets. Test subjects should be able to read at least four of the five letters in each box. The letters are:

	Column A	Column B	Column C
Line 1	Z D S V R	H O N C Z	C Z R S H
Line 2	D S C H V	V Z O N S	Z N O R D
Line 3	N D V O Z	V N S C H	V C D N O

*The Snellen acuity ratings represented by each line are:*

	10-inch Test	13-inch Test	26-inch Test
Line 1	20/70 (10/35)	20/70 (13/45)	20/70 (26/91)
Line 2	20/40 (10/20)	20/40 (13/26)	20/40 (26/52)
Line 3	20/30 (10/15)	20/30 (13/19)	20/30 (26/39)



10-inch acuity test

13-inch acuity test

26-inch acuity test

### 10-inch Acuity Test

*Procedure:* Follow the rules of posture, etc., discussed on page 6. Move the Telebinocular cardholder to the 10-inch mark shown on the scale. Instruct the tester to read the letters in all blocks on line 1, then line 2, then line 3.

*Remarks:* Because of the strain on the lateral eye balance, which may occur when a person works at an extremely close distance (eight to twelve inches), it is important to conduct this test as near to the actual working distance as possible. If it is suggested that an employee consult a vision specialist, the doctor should be aware of the working distances involved.

### 13-inch Acuity Test

*Procedure:* Observe the rules of posture given on page 6. Adjust the cardholder to the 13-inch distance marked on the scale. Proceed as in the test above.

## 26-inch Acuity Test

This test is particularly useful for checking the vision of persons over 50 years of age who must have sharp vision at distances of from 20 to 30 inches. *Accommodation* (focusing ability) deteriorates with age. Thus, some individuals may be able to see clearly at 16 inches (standard "near point") but not at 20 to 30 inches. The usual correction for this condition is the trifocal-or "continuous vision"-lens.

*Procedure:* Follow the rules of posture on page 6. Set the cardholder to the 26-inch mark on the scale. Proceed as in the tests above.

If the tester wears bifocals, test through the upper and lower lens segments. If he/she is wearing trifocals, test through the middle segment of the lens. If single-vision lenses are worn, test through them. Or, if the tester has only *reading glasses*, test through the lenses and without the lenses.

*Remarks:* Persons less than fifty who pass both the far-and-near-point tests of the Comprehensive Battery will normally experience no difficulty in the 20/30-inch range and may be considered as having satisfactory vision. Persons fifty years of age or older however, who regularly work within this intermediate distance range should be given this test unless trifocals are worn. (*Note, however, that if the near-point tests, viewed through the reading segment of the trifocal lenses, are not passed, this 26-inch test should be given...with the tester using the middle segment of the lenses.*)

## GLOSSARY

*This brief glossary of technical terms is presented to assist those persons who administer and interprets Keystone vision screening tests.*

*Acuity= sharpness of sight: The capacity of either eye to recognize small intervals in the discrimination of form and shape; monocular vision.*

*Binocular= pertaining to both eyes working together.*

*Depth awareness= perception of depth in visual spaces due to any clues, whether monocular or binocular, such as stereopsis, size of objects, interference of one object with the full view of another, motion, size change for distance, shadows, etc. (See stereopsis.)*

*Esophoria= the tendency of the eyes to turn inward; overconvergence.*

*Exophoria= the tendency of the eyes to deviate outward; underconvergence.*

*Far point= the equivalent of optical infinity, a distance of 20 feet or more.*

*Fusion= the integration of the two images of an object seen by the two eyes into a single image.*

*Hyperphoria= the tendency of either eye to turn upward; vertical imbalance.*

*Lateral field of vision= the ability to detect objects to the right or left while the eyes are fixed on an object straight ahead.*

*Lateral imbalance= the tendency of the eyes to deviate inward or outward; esophoria or exophoria.*

*Monocular= pertaining to one eye alone.*

*Near point= normal reading distance; the optical equivalent of approximately 16 inches.*

*Overconvergence= the tendency of the eyes to turn inward; esophoria.*

*Occlusion= covering or closing one eye.*

*Periphery= the outer areas of the visual field of the eye.*

*Simultaneous vision= constant vision in both eyes.*

*Snellen tests= examinations used to determine monocular acuity at 20 feet, using printed letters of a special design arranged in rows of different sizes on a card or chart. (Results are expressed in fractions; the numerator is always*

20 and the denominator is related to the height of the smallest letters recognized.)

*Stereopsis*=depth perception due solely to the correlated vision of both eyes. (See depth awareness.)

*Underconvergence*=the tendency of the eyes to turn outward; exophoria.

*Usable vision*=the acuity of either eye while the other eye is open and seeing.

*Vertical imbalance*=hyperphoria (which see).

## *SUMMARY OF TEST QUESTIONS*

### *RAPID SCREENING TESTS*

#### **Far-point tests**

1. In the blocks at the top are a series of letters. Starting with column 1, what letters do you see in the upper part of the block? In the lower part of the block? (Continue with the upper and lower blocks in column 2 and 3.)
2. In the center block are three rows of symbols. Does one symbol seem to float out toward you? Which one? Which symbol floats out on each of the next lines?
3. What number do you see in each of the four blocks at the bottom?

#### **Near-point tests**

4. (*Paragraph reading: Optional*) Please read the statement in the bottom block. (Use pointer if necessary.)
5. (*Snellen letter test*) Starting with column A, read the letters in each line down from 1 to 6. (*Continue with columns B and C.*)

## *COMPREHENSIVE TEST BATTERY*

#### **Far-point tests**

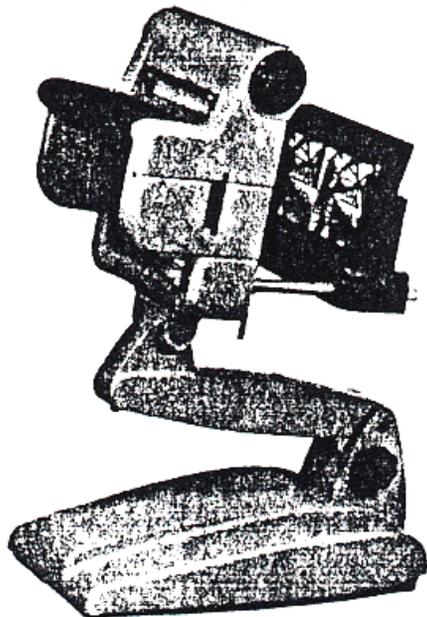
1. Do you see a yellow line? Do you see a group of red symbols? Through which of the symbols does the yellow line pass?
2. To which number, or between which numbers, does the arrow point?
3. How many balls do you see?
4. Here's a railroad bridge. On the bridge is a series of ten signboards. The first one is largest and closest to you. In each signboard are five white diamond shapes. On the first signboard, where is the dot: Top, bottom, left, right, or center? Where is the dot in the numbers 2,3,4, 5, etc.?
5. Follow same procedures as for Test 4.
6. Follow same procedures as for Test 4.
7. On this card are six rows of symbols. (Point to top line and name each symbol.) Does one symbol seem to float out toward you in 3-D? Which one? Which symbol float out on each of the next lines?
8. What number do you see in the top ball? In the lower left ball? In the lower right one?
9. Follow same procedures as for Test 8.

#### **Near-point tests**

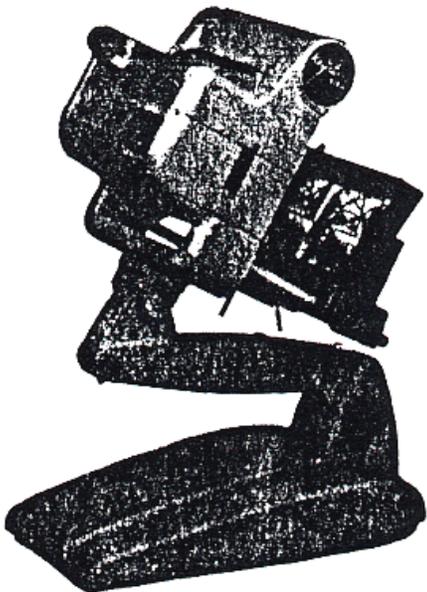
10. Through which of the red symbols does the yellow line pass?
11. To which number, or between which numbers, does the arrow point?
12. How many balls do you see?
13. In the three circles in the center (indicate with pointer) you see black crossed lines, black dots, and solid gray. Around the outside are 22 circles. In No.1 you see black dots. No. 2 has black lines. What do you see in No. 3? Go as far as you can.
14. *Same procedures as for Test 13.*
15. *Same procedures as for Test 13.*

## TESTING AND CLASSIFICATION TIPS

**TESTING:** Remember, when testing bifocal wearers at near point (Test 9-10 through 9-15), the Telebinocular must be adjusted to allow the tester to look comfortably through his/her bifocal segments. This is accomplished by tilting the Telebinocular viewing head down to place the cardholder in a "reading" position below the eyes. Be sure the tester doesn't alter the position of his/her head. Only the eyes should be moved. Return the Telebinocular head to the normal position before the next test sequence.



NORMAL POSITION



ADJUSTED FOR BIFOCAL WEARERS

**CLASSIFICATION:** The RETEST COLUMN on the record form can also be considered as DOUBTFUL PERFORMANCE-that is, between passing and failing. Retest at your discretion. We have marked the column RETEST only as a suggestion. Tester performance may be affected by fatigue, medication and other factors. A "doubtful" performance may become a passing performance on retest.

Also, responses falling in the UNSATISFACTORY areas on the form-especially for the usable vision tests-may be interpreted differently according to your own judgment. For instance, UNSATISFACTORY usable vision at far point is listed at 92% (20/28). This value should be used for persons whose job performance depends on adequate vision at distance, truck drivers and other operators of mobile equipment. However, YOU may adjust the UNSATISFACTORY rate downward (less critical) for other job classifications, where critical vision at far point (20 feet) isn't a requirement. For instance, a file clerk could probably work satisfactory if he/she scored only at 88% (20/32).

The pass/fail standard for the near point usable vision tests can also be adjusted. For instance, an inspector, accountant or typist would need good vision at near. 90% (16/18) or better, but may not require distance vision as good as a truck driver because their job doesn't demand it. use your own judgment according to the job placement recommendations set up by your company.

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