

Color Vision Deficiency (CVD) also known as Color Blindness
By Chief Doug Hambleton
Berkeley Police Department

In mid-2006 the Berkeley PD had an officer applicant who had failed the City's color vision test. There are two common tests for CVD. The Ishihara test is the one most people are familiar with. It is a series of color pictures composed of different color dots that have subtle patterns showing numbers or shapes. A more advanced test for those who fail the Ishihara test is the Farnsworth D-15 which requires sorting 15 discs based on color shades. Our candidate had failed both exams.

The candidate reported that he had obtained a contact lens that corrected the problem. Our applicant was using a new technology called Chromagen Color Deficiency Lens System. In my research I also learned about an older technology called the X-Chrom Contact Lens.

I asked other chiefs if they had experience dealing with this issue and this is what I learned. I only received a few responses.

One department has hired 5 officers with CVD. They have not experienced any performance problems.

One department has hired 2 offices with CVD. They require the officers to wear the corrective contact lens.

Another department was faced with a similar candidate and had sought advice from the LAPD vision expert. This agency rejected the applicant.

It was not clear if the candidates at these other agencies had failed only the Ishihara test or the Farnsworth D-15 as well.

If any agency is faced with a similar circumstance I recommend reading the POST Medical Screening Manual, which can be found at www.post.ca.gov/selection/medical.asp. Chapter XI covers vision issues. I suggest reading the introduction and then the section on CVD starting on page 47. This section of the manual was last revised in July 1994. Since the section was 12 years old and our candidate claimed the use of new technology we conducted additional research (see the memorandum that follows).

We eventually arranged for the candidate to be examined by a doctor at the University of California, Berkeley, School of Optometry. Based on the evaluation by an expert in the field our candidate was not hired.

June 26, 2006

To: Chief Hambleton

From: AMA Christiansen

Subject: COLOR VISION – POST GUIDELINES AND ADDITIONAL RESEARCH

Here is the information we have gathered while having Police Officer Recruit Applicant XXXXX in the pre-employment medical screening process:

In contacting POST Standards and Evaluations Unit, I spoke with Shelley Spilberg (916) 227-4824. She said that she was familiar with contact lenses as correction for color vision problems and stated that the lenses do not cure the problem but provide some help for differentiating colors. She said that POST gathered a group of experts in the field including members of firms that manufacture the contacts and the group concluded that the lenses do not correct the issue to the level needed for the types of tasks that police officers are asked to perform. She said that POST disallows the use of the lenses while going through the vision tests. (Page XI-67)

The POST Medical Screening Manual also states that color correction lenses are not to be used for the pre-employment color vision test as it violates the basic illumination required for the test; the contact lenses brighten certain colors and consequently allows the wearer to see a greater contrast between the background and the test number imbedded in the background, as opposed to having the wearer distinguish between the background and the test number by the use of colors. (Page XI 63-64) Also in the POST Medical Screening Manual is the requirement that those persons who wear contact lenses to pass the Visual Acuity tests must have had 1 year of successful year prior to taking the Medical Screening test. (Page XI-65)

The National Library of Medicine and the National Institutes of Health state, “Subjectively, subjects reported enhanced colour perception, but poor vision in dim light. Judgment of distance and motion were only slightly affected. We conclude that ChromaGen lenses may enhance subjective colour experience and assist in certain colour-related tasks, but are not indicated as an aid for CVD in occupations with colour vision-related restrictions.”

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11396392&dopt=Abstract

In other research about the ChromaGen contact lens system, I found this explanation of how they work and how successful it can be in correcting color vision deficiencies. Be advised that the person writing this article is also a dispenser of the product. Additionally, the wearers of the lenses report some fluorescence and 3-D affect with the lenses that lessened with time.

“Before therapy, the ‘normal’ person might see 10,000 colours and the colour defective only 2,000, but after therapy, the colour defective may have 6,000 colours. The therapy does not give the colour defective perfect colour perception, but it does give them more colours, plus an ability to see colour differences which they could not see before and more accurate colour naming. They feel more ‘normal’ and hugely excited by their new colour perception ability”.

<http://www.nfburnetthodd.com/chromagen.pdf>

The FAA does not allow pilots to wear lenses that correct color vision. Here is their statement about the lenses, “ Although no eyeglasses will correct a color vision deficiency, a contact lens called X-Chrom can partially correct it. The problem is that while X-Chrom lenses can help your vision in one way, they can impair it in other ways. Because of this, the FAA does not allow pilots to wear them.”

www.studentpilot.com/articles/aviation_articles/article.php?aviation_id=98

The FAA will not allow the use of an X-chrom contact lens as a means for correcting color deficiencies. The X-chrom lens technique uses a rose colored contact lens in one eye, which results in a "luster" of the color that is typically confused by the pilot and increases the ability of the color deficient pilot to distinguish colors. The FAA specifically prohibits this practice in aviators and controllers.

The recently (November 99) FDA approved ColorMax glasses are also used to enhance color discrimination in color weak individuals. The glasses were featured in the January 4, 2000 USA Today (page 8D). These glasses essentially use color reflecting coatings to alter color perception and enhance discrimination in weak color frequencies. Because other colors may be altered as well, and the deficiency is not completely corrected, **the FAA has not approved these glasses for color deficient pilots or controllers.**

<http://www.aviationmedicine.com/articles/index.cfm?fuseaction=displayArticle&articleID=31>

In the next section, I have included some excerpts from the POST Medical Screening Manual that specifically have bearing on this issue. Also included at the end of the document are a number of other agencies’ color vision requirements.

The whole POST Medical Screening Manual can be accessed at <http://www.post.ca.gov/selection/medical.asp>

ESSENTIAL JOB FUNCTIONS

Neither state nor federal law require hiring applicants who, even with reasonable accommodation, cannot perform the essential (vs. marginal) job duties – defined as the fundamental job duties of the position. The designation of essential job functions for a given position is the purview of the employer, not the physician. Legitimate bases for determining essential job functions include:

- employer's judgment
- written job descriptions
- amount of time spent on the job performing the function
- consequences of not requiring the incumbent to perform the function
- collective bargaining agreement
- work experiences of past incumbents
- current work experience of incumbents

Not every function that all employees actually perform constitutes an essential function. The key to determining whether a job duty rises to the level of being "essential" is if the removal of the function would result in a fundamental change in the position itself.²

The following is from the Medical Screening Manual and is a synopsis of the Color Vision requirements:

SUMMARY: Patrol officers require adequate color vision in order to identify cars, clothing and other items, as well as to detect and distinguish traffic lights, street lights, and related highway lights. However, those with mild color vision deficiencies have been found to have sufficient color identification and discriminational skills to perform as a patrol officer. **Therefore, candidates who fail the PIP test should be administered the Farnsworth D-15. Those who fail the D-15 should be restricted from field duty requiring color identification and discrimination.**

The sensitivity of the D-15 can be improved by requiring additional testing of color-naming abilities. However, due to problems with standardization in test administration and score interpretation, use of in-house color naming tests is not recommended for most agencies.

- Corrective Lenses:

Some optometrists or physicians will dispense a rose-colored contact lens ("X-Chrom" lens) to persons with CVD. When worn in one eye, the lens will allow a person to pass a pseudoisochromatic plate test because the lens introduces a brightness difference between the figure and the background. The effect is equivalent to looking at the plates through a red filter and violates the basic illumination requirements for the test. In fact, Matsumoto, et al. (1983)

Revised 7/94

XI - 53

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ed.

- Candidates should demonstrate a minimum stereopsis of at least 40" of arc by achieving a score of 6 or better on the Titmus Stereo Test.

5) COLOR VISION DEFICIENCY

- Candidates who fail the PIP test should be required to pass the Farnsworth D-15.
- Use of rose-colored lenses (i.e., "X-Chrom") should not be permitted during

Blacksburg Police Department Police Officer Selection Requirements

I. Conditions of Employment

1. Must be a citizen of the United States.
2. Must be 21 years of age.
3. Live within a 25 mile radius of Blacksburg or be willing to relocate.
4. Must be physically able to perform essential job functions which are attached.
5. Vision must be corrected to 20/20 and may not exceed the following: vision must be 20/50 or better in one eye uncorrected and 20/100 or better in the other eye uncorrected. Color blindness shall be disqualifying, to include pronounced shade deficiencies.
6. Must be a high school graduate or able to furnish documentary evidence of equivalency.
7. Must currently have or obtain a valid Virginia Driver's License within 30 days of employment.
8. No criminal convictions - minor traffic violations are allowed.
9. Must have good credit rating.
10. Must successfully complete all phases of the selection process.
11. Upon appointment, you will serve as a probationary employee for one (1) year. Officers serving in a probationary status may have that period extended for "less than satisfactory job performance" or be dismissed from employment at the discretion of the Chief of Police.

Police Officer

Arlington, Texas

Salary: \$3,267 per month

Closing Date: Until Filled

Requirements

Bachelor's degree from an accredited college.

Must be a U.S. citizen with a minimum age of twenty-one (21) years of age.

Must possess 20/20 vision, either corrected or uncorrected in each eye. Uncorrected vision cannot exceed 20/100 in each eye, unless vision is corrected by the use of contact lenses which must be worn on duty and/or during all enforcement related activities.

Must be free from dichromatic color blindness, night blindness, and any other visual deficiencies or limitations. Persons who have had eye surgery will not be eligible for one year after surgery.

Must possess hearing with less than 30 decibel loss, either corrected or uncorrected in each ear. Uncorrected hearing cannot exceed 60 decibel loss in each ear.

All employment opportunities within the Purdue University Police Department route through

[Purdue University Human Resource Services.](#)

The basic skills and abilities required for becoming a police officer within the Purdue University Police Department are:

- Strong verbal and written communication skills and consistent use of good judgment and good public relations skills.
- Physical and mental capability of performing all duties required of a police officer – including the ability to lift and carry 150-200 pounds in emergency situations.
- Must be at least 21 years old.
- Must have earned a high school diploma.
- Cannot be color-blind. Must possess 20/100 uncorrected vision.
- Must have a valid driver's license.
- A Purdue University Police Department physical abilities test required.

Within the first 12 months of employment, must successfully complete the Purdue Officer 40-hour Pre-Basic Training Course (ILEA) and the Indiana Law Enforcement Academy basic officer training course.

Purdue is an equal access/equal opportunity/affirmative action employer fully committed to achieving a diverse workforce.

The Community: The Village of Northbrook was incorporated in 1901 and currently has a resident population of approximately 34,000. Northbrook is located in northeastern Cook County about 25 miles north of downtown Chicago.

REQUIREMENTS:

- Be a U.S. Citizen
- Be at least 21 years old by date of written exam and maximum age not past 35th birthday.
- Attend mandatory orientation and all phases of the testing process
- Pass thorough medical, polygraph and psychological examinations
- Must possess a social security number
- Have a birth certificate or certified copy and a valid driver's license
- Possess an Associates Degree or 60 semester hours from an accredited college or university
- Possess military discharge papers (if applicable)
- Possess documentation of name change (via marriage, divorce or other), if applicable.
- All documents must be presented at time of application
- Vision correctable to 20/20 and free from color blindness

Winnipeg Police Services-Canada

VISION STANDARDS

Those not requiring glasses or contact lenses:

20/20 Vision (binocular - using both eyes)

Those requiring glasses:

Without glasses: 20/40 binocular (using both eyes) with 20/40 in the weaker eye
With glasses: 20/20 vision (binocular – using both eyes)

Those requiring contact lenses:

Use of soft contact lenses is permissible if at least one successful year of use.
Without contact lenses: 20/40 binocular (using both eyes) with 20/80 in the weaker eye
With contact lenses: 20/20 vision (binocular – using both eyes)

Colour Vision Deficiency:

No colour blindness or colour vision deficits
Candidates who fail the PIP test should be required to pass the Farnsworth D-15
Use of rose-coloured lenses should not be permitted during testing