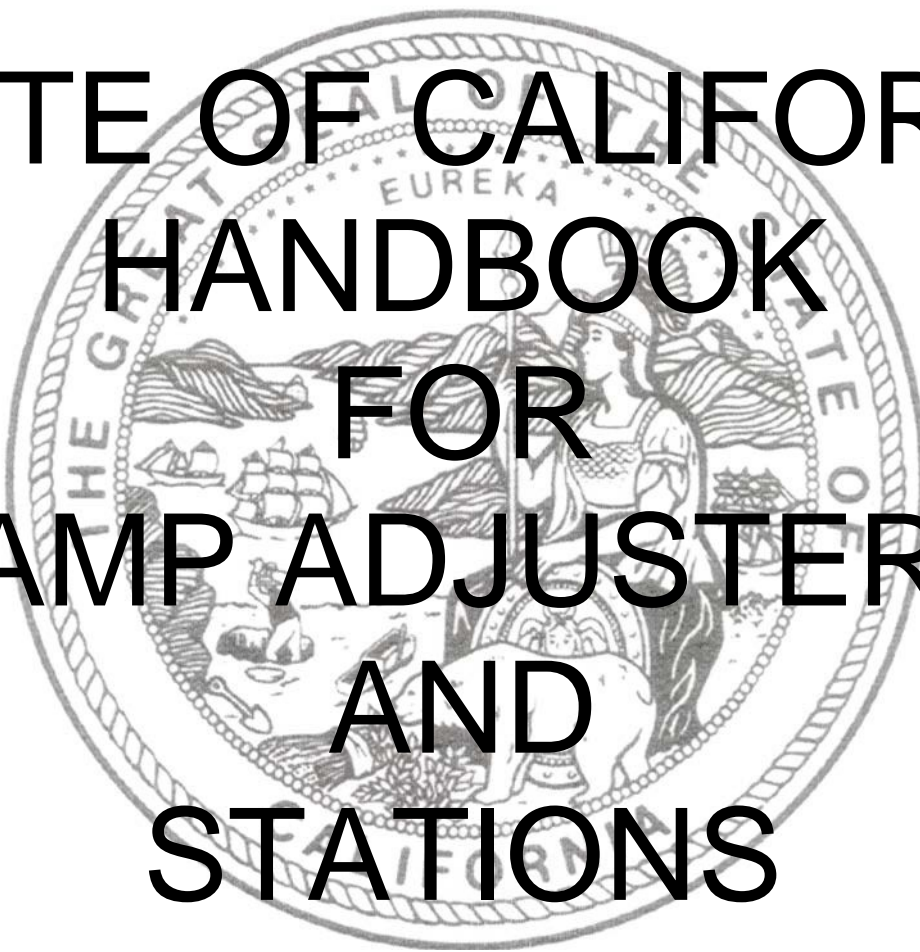


DEPARTMENT OF CONSUMER AFFAIRS



Bureau of Automotive Repair

STATE OF CALIFORNIA HANDBOOK FOR LAMP ADJUSTERS AND STATIONS



May 2015

STATE OF CALIFORNIA



DEPARTMENT OF CONSUMER AFFAIRS

BUREAU OF AUTOMOTIVE REPAIR HANDBOOK FOR LAMP ADJUSTING STATIONS

FOREWORD

This handbook for Official Lamp Adjusting Stations is intended to serve as a reference for Official Lamp Adjusting Stations and licensed Lamp Adjusters and persons desiring to be licensed as adjusters.

The objective is to provide uniformity in the licensing of stations and adjusters, and in the adjusting, servicing and inspecting of vehicle lighting equipment to ensure the safety of the motoring public.

The installation, repair, and adjustment of motor vehicle lighting equipment must be done in compliance with the California Vehicle Code and other appropriate laws and regulations, technical instructions and procedures contained in appropriate service manuals and bulletins of lighting equipment and vehicle manufacturers.

This handbook includes the procedures for the licensing of Official Lamp Adjusting Stations, Official Lamp Adjusters, and lamp adjusting procedures. This handbook will not supply all the information needed to pass a licensing exam. See the applicable Candidate Handbook for further information.

Periodically, supplemental bulletins may be distributed by the Bureau of Automotive Repair (BAR) containing information regarding changes in laws or other material contained in the handbook. Such supplemental publications should be kept with the handbook for easy reference.

The support and cooperation of Official Lamp Adjusting Stations and Adjusters will help make our highways safe through providing motorists with properly equipped vehicles.

Suggestions for improvement of this handbook are welcomed. Comments should be addressed to the Bureau of Automotive Repair, 10949 North Mather Blvd., Rancho Cordova, CA 95679

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CHAPTER 1 - LICENSING OF OFFICIAL LAMP ADJUSTING STATIONS

Classes of Official Lamp Adjusting Stations.

Classes of Official Lamp Adjusting Stations:

a. **Class A.** Class A official lamp adjusting stations shall be equipped to test, inspect, adjust and repair all lamps and related electrical systems on all vehicles.

b. **Class BL.** Class BL (B-limited) official lamp adjusting stations shall be equipped to adjust all lamps with aiming pads on all passenger vehicles and commercial vehicles 80 inches or less in width. Such stations shall be equipped to test, inspect, and repair all lamps and related electrical systems on all vehicles except motorcycles and motor-driven cycles.

Scope of Station Licenses.

A licensed station shall not certify the adjustment of lamps on any vehicle of a type not included in the scope of the station's license. The complete station license number shall always be recorded on any certificate of adjustment.

Fleet Owner Stations.

A station license of any class may be issued to an owner of a fleet of three or more vehicles provided the station meets the requirements for the class of station designated in the application. A fleet owner station need not display a sign or post prices and is required to maintain the necessary manufacturer's specifications

and instructions only for those vehicles serviced by the fleet owner station. Such a station shall service and maintain only those vehicles owned and/or operated by the fleet owner and the license must be of a class appropriate to the types of vehicles constituting such fleet.

Application for Station License.

An Automotive Repair Dealer may obtain an application for a Lamp Adjusting Station license from a BAR office or from the BAR Licensing Unit. Applications are also available on the BAR Internet Web Page at www.autorepair.ca.gov or by calling BAR's toll free number 800-952-5210.

After the Licensing Unit receives the application, the station will be scheduled for inspection by a BAR representative. The station must meet all BAR requirements including the following: possession of all required signs as described in California Code of Regulations (CCR) Section 3307; have all tools and manuals as described in CCR Section 3316; and, employ a licensed adjuster.

Station License and Renewal Fees.

Lamp station licenses issued by the Licensing Unit are subject to the following fees:

a. For an initial license, including a change of ownership or class of station: \$10.

b. For a renewal license that is renewed prior to expiration of the old license: \$5.

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c. For a renewal license renewed within 30 days after expiration of the old license: \$7.50.

d. For a duplicate of a lost, destroyed, or mutilated license: \$2.

e. For a replacement of a license due to a change of address or a change of name not involving a change of ownership: No Fee.

(1) Change of Address - Defined.
A Change of address@ means any relocation of a licensed business not involving a change in ownership or any change in the mailing address, including a change resulting from street renumbering.

(2) Change of Ownership - Defined.
A Change of ownership@ means any change in legal ownership of the licensed business, including the addition or deletion of partner, transfer of ownership between members of a family, or disposal of one business in favor of a similar business at a different location.

Lost, Destroyed, or Mutilated Licenses.

If an official station license is lost, destroyed, or mutilated, an application with the appropriate fee may be submitted for a duplicate license. If a lost license is found following issuance of a duplicate, the original license shall then be returned to BAR.

Replacement License.

In the event of a change of name, not involving a change of ownership, or a

change of address of the licensed station, the license shall be returned to the Licensing Unit with an application for a replacement license. The original license will be canceled and a corrected license for the balance of the unexpired term will be issued.

License Term.

Official lamp adjusting station licenses are valid for one year and may be renewed upon expiration. Stations whose license has expired and has not been renewed shall immediately cease any activity requiring a license.

License Renewal.

A renewal application is normally mailed to the dealer prior to the expiration of the license. (If the dealer does not receive a renewal application before the station license expires, the dealer should call the Licensing Unit for further instructions.) The dealer should send the renewal application plus a fee of \$5 to the Licensing Unit during the 30-day period prior to the date of expiration. If the license is allowed to expire, the station may no longer operate as a licensed station, but the dealer may still apply for renewal of the license by sending an application plus a late renewal fee of \$7.50 during the 30-day period following the expiration date. A license will not be renewed if the application is received by the Licensing Unit, postmarked more than 30 days after the date of expiration. The dealer will have to apply for a new license and send \$10, the fee for a new license, to the Licensing Unit.

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General Requirements.

The specific and detailed requirements applicable to official lamp adjusting stations are contained in Article 2 starting with Section 3304 and Article 3 starting with Section 3315 of Title 16 of the California Code of Regulations (CCR). These regulations are also contained in the Laws and Regulations Handbook published by BAR. Certain requirements are as follows:

a. Written Estimates. An official lamp adjusting station is required to register as an Automotive Repair Dealer and the law requires such station to maintain a registration that is valid. This station, as an Automotive Repair Dealer, is required to give each customer a written estimated price for labor and parts necessary for a specific job, and no work shall be done and no charges shall accrue before authorization to proceed is obtained from the customer (CCR Section 3353). No charge shall be made for work done or parts supplied in excess of the estimated price without the oral or written consent of the customer. The customer shall also be given an itemized invoice as specified in CCR Section 3356(a).

b. Display of Station Sign. Each Official Lamp Adjusting Station must obtain and display an official station sign meeting the specifications contained in Section 3307 of Title 16, CCR. The sign must be displayed in a location where it is clearly visible from outside the station, either on the exterior of the premises or in a window. Information regarding vendors of official station signs may be obtained at BAR's Internet page at www.smogcheck.ca.gov, from a BAR field

office or the Communications and Education Division in Sacramento, (916-324-1691).

c. Presence of an Official Adjuster. A licensed lamp station must provide the services of an appropriately licensed adjuster during normal daytime business hours for not less than 40 hours per week or, if open less than 80 hours per week, for not less than one-half of the total hours each week the station is open for business. An official station which no longer employs a licensed adjuster shall immediately remove or cover the official station sign and cease to operate as a licensed station. If the station does not employ an official adjuster within 60 days, the official station license and all unused lamp certificates shall be returned to BAR.

d. Posting of Price Sign. Each official station except a fleet owner station may make reasonable charge for the work performed and shall post conspicuously a list of price ranges for the specific activities for which it is licensed. Prices may be stated either as a fixed fee or an hourly rate on a time-and-material basis. No added charge shall be imposed for the issuance of an official lamp adjustment certificate or certifications on enforcement documents of the correction of lamp violations. No charge relating to repair, replacement of parts, or adjustment of lamps shall be imposed in addition to the posted price for such adjustment or inspection unless such additional work and added charges are authorized in advance by the vehicle owner or operator.

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e. Lamp Adjustment Certificates and Certification of Enforcement Documents.

Official lamp stations may obtain lamp adjustment certificates at the nearest BAR field office or by mail from BAR Headquarters. Certificates are sold only to an authorized representative of a licensed lamp station and identification of such persons is required. Stations may not charge a customer for a Lamp Adjustment Certificate.

(1) A copy of each lamp certificate issued shall be filed and retained by the station for three years from the date of issue. BAR recommends that the certificate number be recorded on the repair order or invoice for future reference.

(2) Lamp certificates, work orders and invoices shall be maintained by stations for a minimum of three (3) years. These items also shall be available for inspection by a representative of the Bureau of Automotive Repair.

f. Adjustment and Repair. All adjusting and repairing of lamps and related systems necessary to correct and clear violations noted on an enforcement document and to issue an Official Adjustment Certificate shall be performed in an official station in accordance with accepted industry practices, standards, and recommendations, the specifications and instructions of the vehicle or lamp component manufacturer(s), the California Vehicle Code, and the instructions and regulations of BAR. Official stations are advised to maintain reputable business and performance standards in all transactions,

including work not requiring official certification.

g. Required Tools and Reference Material. Official Lamp Adjusting Stations must have on the premises all tools and equipment relative to their class of license (CCR 3316). All required tools and equipment must be kept in good serviceable condition. Stations must also have reference material relative to vehicles being inspected and /or repaired.

h. Inspection of Stations. Each official lamp adjusting station will be inspected periodically by a representative of BAR. The licensee or an authorized employee will be required to sign BAR=s completed Official Station Inspection Form. A copy of the completed inspection form will be provided to the licensee. Violation of BAR regulations noted during the inspection will be brought to the attention of the licensee for immediate corrective action. Failure to correct violations may result in action to suspend or revoke the station license or in the filing of a criminal complaint against the station owner and/or adjuster.

CHAPTER 2 - PUBLIC RELATIONS

Complaint Prevention.

Vehicle owners are referred to official lamp adjusting stations by the California Highway Patrol and the Department of Motor Vehicles. Stations should make it as easy as possible for motorists to have lamp deficiencies corrected.

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In order to prevent unnecessary complaints, lamp adjusting station owners are encouraged to:

a. Advertise Station Location. Public notice as to station location and services available should be provided.

b. Resolve Variances. Stations that notice a variance of readings between their station and another station=s equipment should communicate directly with the Bureau of Automotive Repair in order that the alleged variances may be expeditiously resolved and proper corrective action be taken when necessary.

d. Post Prices. Official stations are required to follow the regulations (see 3307(d) CCR) pertaining to the proper posting of prices for adjustment and repairs. Where repairs are necessary to obtain a proper adjustment, the motorist must be advised of the reasons and additional cost for such repairs and authorize the work.

e. Re-aim Replacement Headlamps. Although the law does not require re-aiming of a sealed beam headlamp unit after replacement, the station should encourage the motorist to have the aim tested after installation because the aim is controlled through the lens and aiming pads and not by the seating surface adjacent to the housing.

f. Maintain Station Image. Official Lamp Adjusting Stations are designated by the Bureau of Automotive Repair to certify that corrective action has been performed on vehicles cited for certain deficiencies

Therefore, the owner of such a vehicle looks upon an Official Lamp Adjusting Station as an authorized agency of the State and, as such, he/she expects to be treated accordingly.

CHAPTER 3 - LICENSING OF OFFICIAL LAMP ADJUSTERS

OFFICIAL LAMP ADJUSTERS.

Classes of Adjuster Licenses.

Class AA@ is the only class of Official Lamp Adjuster license. Official Lamp Adjusters' licenses are issued to persons who have shown by examination that they are qualified to test, inspect, adjust, and repair the lamps and related electrical systems on all vehicles.

Scope of Adjuster's License.

A licensed lamp adjuster shall not certify the adjustment or operation of lamps on any vehicle that is not in compliance with the California Vehicle Code sections relating to lamp adjustment and/or requirements.

Adjuster Licensing Procedures.

a. A person desiring an Official Lamp Adjuster's license may obtain an application at any BAR office, and mail it to the BAR Licensing Unit in Sacramento. Care should be taken that information on the application is accurate and legible. Each application for a new or renewal license shall be accompanied by a fee of ten dollars (\$10) for a new license or five dollars (\$5) for a renewal license. If the renewal application

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is received by the bureau within 30 days after the date of expiration, the late renewal fee shall be \$7.50. The application shall be made upon a form furnished by the director. It shall contain such information concerning the applicant's background and experience as the director may prescribe, in addition to other information required by law.

b. If the application is acceptable, the applicant can schedule a written examination on applicable laws, regulations, lamp repair and adjustment procedures. A passing score on the examination is required to issue an adjuster's license.

License Term and Renewal.

Official lamp adjuster licenses issued by BAR shall expire on the last day of the adjuster's birth month; therefore, an initial license may be valid for 42 to 54 months. Subsequent licenses are valid for up to four years, expiring on the last day of the adjuster's birth month.

Display of License in Official Station.

The license of each official adjuster employed in an official lamp adjusting station must be prominently displayed in the station under glass or other transparent covering. When any licensed lamp adjuster ceases to be employed at an official station, the adjuster's right to act as an official lamp adjuster shall immediately cease, and he/she shall not engage in the activity of an official lamp adjuster until he/she is again employed at an appropriate official lamp adjusting station. While

unemployed he/she shall not certify the adjustment of lamps on any vehicle. Any unused certificates must remain with the Official Lamp Station and are not the personal property of the adjuster. When he/she is again employed at an appropriate official lamp adjusting station, he/she may resume his/her activity unless the term of the license has expired.

Note: The home address on the lamp adjuster license may be covered while

posted at the Official Lamp Adjusting Station.

Lost, Destroyed, or Mutilated Adjuster License, or Additional Copy Needed.

An application for a duplicate license shall be submitted to the Licensing Unit whenever an adjuster license is lost, illegible, or destroyed. If a duplicate is desired for an illegible or mutilated license, the original license shall accompany the application. If the license has been lost or destroyed, it shall be so noted on the application. A written examination is not required when the application is for a duplicate license. The fee for a duplicate license is \$2 each.

CHAPTER 4 - DISCIPLINARY ACTIONS.

Suspension or Revocation of Licenses.

The director may suspend, revoke, or take other disciplinary action against a license as provided in this article if the licensee or any partner, officer, or director thereof:

(a) Violates any section of the Business

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and Professions Code which relates to his or her licensed activities.

(b) Is convicted of any crime substantially related to the qualifications, functions and duties of the license holder in question.

(c) Violates any of the regulations promulgated by the director pursuant to this chapter.

(d) Commits any act involving dishonesty, fraud, or deceit whereby another is injured.

(e) Has misrepresented a material fact in obtaining a license.

(f) Aids or abets an unlicensed person to evade the provisions of this chapter.

(g) Fails to make and keep records showing his or her transactions as a licensee, or fails to have the records available for inspection by the director or his or her duly authorized representative for a period of not less than three years after completion of any transaction to which the records refer, or refuses to comply with a written request of the director to make the record available for inspection.

(h) Violates or attempts to violate the provisions of this chapter relating to the particular activity for which he or she is licensed.

(i) Is convicted of a violation of Section 551 of the Penal Code.

Voluntary Surrender of Licenses.

The voluntary surrender of an official

station or adjuster license is subject to the provisions of Section 3308 of Title 16 of the California Code of Regulations. An official station shall stop performing the functions for which it has been licensed when it no longer has the services of a licensed adjuster, or when its station license has expired or has been surrendered, suspended, or revoked. Such station must dispose of materials related to its formerly licensed activity according to these provisions.

(a) Loss of Services of Licensed Adjuster. An official station that no longer has the services of a licensed adjuster shall immediately remove or cover the official station sign in accordance with section 3308(b). If such station does not employ a licensed adjuster within 60 days, the station shall surrender its official station license to the bureau and shall return to the bureau all unused certificates of adjustments bought by the station to carry out the function for which it is no longer licensed.

(b) Removal of Sign. An official station that is no longer authorized to perform the function for which it has been licensed shall remove or cover the sign pertaining to the licensed function. A station that has a multipurpose sign shall cover those portions of the sign that pertain to the functions for which it is no longer licensed.

(c) Return of Certificates. When an official station license has expired or has been surrendered, suspended, or revoked, the station shall return to the bureau all unused certificates purchased by the station to carry out the function for which it is no longer licensed.

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CURRENTLY APPROVED HEADLAMP AIMERS AS OF SEPTEMBER 2002

MAKE AND MODEL	TYPE	CLASS
AC		
T3 Type H (Model G2 Transit)	Portable	Mechanical
ATLAS		
140 (Model G2 Transit)	Portable	Mechanical
560 Portable	optical	
561 Track	Optical	
565 Track	Optical	
BEAR		
560 Portable	Optical	
561 Track	Optical	
565 Track	Optical	
BLACKHAWK		
AL 10L - AL 10R	Portable	Mechanical
HOPKINS		
Model B4A (With built-in Transit)	Portable	Mechanical
Lev-L-Lite B4 (Model G2 Transit)	Portable	Mechanical
Vision 1	Track	Computerized
Vision 100	Track/portable	Optical
HU-6 Calibrating fixture for Hopkins type aimers listed above.		
U7 Calibrating fixture for Hopkins type aimers listed above.		
LET CORPORATION		
PLA-12 Headlight Alignment System	Portable	Photo/Diode System
LUJAN USA		
Sniper Model 5412	Portable	Optical
ROTUNDA		
FRE 560	Portable	Optical
FRE 561	Track	Optical
FRE 565	Track	Optical
SYMTECH CORPORATION		
LCA-2	Portable (Track Optional)	Visual/Optical
LCA-2 EZ	Portable (Track Optional)	Visual/Optical
HBA-5	Portable Track	Optical/Photo diode
SNAP-ON		
HE 50 L & HE 50 R	Portable	Mechanical
WEAVER		
Photoscope WX45 - 46	Track	Optical
	Portable	Optical

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CHAPTER 5 - LAMP ADJUSTING INSPECTION PROCEDURES

APPROVED AIMING AND LIGHTING EQUIPMENT.

Aiming Equipment.

All headlamp aiming by official lamp adjusting stations shall be accomplished with aiming equipment approved by BAR. This equipment is listed on page 8 of this handbook.

This handbook does not instruct or illustrate how technicians should adjust headlamps. Technology changes from year to year; therefore, technicians should refer to vehicle and aiming equipment manufacturers= detailed headlight aiming instructions for specific vehicles.

Lighting Equipment.

All required lighting equipment installed on a vehicle must comply with requirements of the California Vehicle Code (VC). Sealed beam lamps and bulbs must be marketed either as direct replacements or approved for on-road use by the United States Department of Transportation (DOT). The adjuster should check for use of illegal high candlepower lights such as halogen, xenon, and super plasma bulbs. The use of illegal sealed beams or bulbs shall cause a vehicle to fail the lamp inspection and a certificate shall not be issued.

Note that some DOT approved bulbs have a light blue tint.

HEADLAMP AIMING PROCEDURE

Preparation for Aiming.

The adjuster should inspect each vehicle

and lamps for various characteristics and deficiencies prior to attempting adjustment of vehicle lamps. The California Vehicle Code requires that headlamps illuminate an object at a specific distance (VC24407) and that a specific minimum voltage be supplied to the lamp (VC24252). The Vehicle Code does not require that a bulb or lamp produce a specific level of intensity. Use of a light intensity meter cannot determine whether the lamp complies with the California Vehicle Code and is not a required piece of equipment.

Vehicle Inspection.

The vehicle should be inspected for the following and necessary corrections made prior to the adjusting or checking of lamp aim:

- a. Remove excessive ice, road tar, or mud from under the fender(s).
- b. See that all tires are properly inflated to the values specified on the sidewalls or the vehicle information label.
- c. Check the suspension for sag or broken springs.
- d. Check for misaligned wheels or improper tracking of rear axle.
- e. See that the vehicle is loaded as normally operated including the driver in the front seat.
- f. Check the functioning of, (if equipped), any "level ride" or pneumatic/hydraulic suspension. The engine should be running during lamp aiming or inspection.
- g. The vehicle should be rocked sideways to settle the suspension.

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h. Clean the lamp lenses and aiming pads. Check for chipped pads if using mechanical aimers.

i. The aiming adjustment screws and the points of contact between the lamp housing and sealed beam unit mounting rings should be lubricated to ensure that they function smoothly.

Lamp Inspection.

The lighting system should be inspected for the following deficiencies in addition to proper lamp aim:

- a. Any burned out filaments.
- b. Any improperly connected circuits which cause the lamps not to function or switch beams correctly.
- c. A headlamp beam indicator lamp that does not indicate the proper beam to the driver or that does not function properly.
- d. Any cracked, broken, or missing lenses. Stoplamps on vehicles manufactured on or after January 1, 1979, shall emit a red light. Stoplamps on vehicles manufactured before January 1, 1979, shall emit a red or amber light. Defective lenses that emit white light during normal operation are not permitted.
- e. Any cracked or chipped aiming pads.
- f. Lenses that are rotated, upside down, wrong side out or otherwise incorrectly installed.
- g. A lens marked "left" or "right" not properly installed.
- h. A lamp with dirt or moisture inside or

any obvious discoloration, contamination or deterioration.

i. A lamp which is not securely or properly fastened to the vehicle.

j. A lamp not perpendicular to the roadway or mounted as designed.

k. A lamp not oriented correctly, eg. A TOP@ not mounted at the top position.

l. A lamp showing a beam or color contrary to law or regulation, i.e., blue dot taillamps, white tail lamps, blue or yellow headlamps, as well as extremely faded lenses.

m. Any defects in wiring that could adversely affect the performance of a lamp. A dimly lit lamp or bulb usually indicates a defect in wiring or connections rather than a defective lamp.

Ensure the lamp has adequate voltage. The voltage at any tail, stop, license plate, side marker or clearance lamp socket on a vehicle shall not be less than 85 percent of the design voltage of the bulb. Voltage tests shall be conducted with the engine operating.

n. Any aftermarket lights, bulbs or signaling devices that are not D.O.T. approved, that have been installed in place of factory lighting equipment.

o. Any auxiliary equipment, screens, or plastic covers placed on, in, or in front of the lamp which is not a part of the original approved equipment that reduces visibility or does not satisfy statutory requirements, i.e. brush guards, etc.

p. All lamps and reflectors visible from the front, sides, or rear of a vehicle except

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headlamps, may have any unlighted color, provided the emitted light from all lamps or reflected light from all reflectors complies with the required color.

Area Required for Adjusting.

Section 3305 (b) of Title 16, CCR, requires that an area be maintained in an official lamp adjusting station for inspecting and adjusting lighting equipment. Other work may be performed in the approved area, as desired. The work area shall be within a building and shall be large enough to accommodate the motor vehicle being serviced. BAR may make an exception to the preceding requirement by approving a work area adjacent to a building for the purposes of inspecting and adjusting equipment on buses, trucks, truck tractors, trailers, and semi trailers. The work area shall be kept clean and orderly.

METHODS OF AIMING

Aiming Screen.

This method involves a visual appraisal of a beam pattern and aim on a screen 25 feet in front of a vehicle. All headlamps and auxiliary lamps that are pointed forward can be aimed in this manner.

a. Working Area. A working area at least 10 feet wide and long enough to accommodate the vehicle to be tested plus 25 feet must be selected for the use of aiming screens. The area where the vehicle is placed must be a flat, continuous plane free of surface irregularities. The screen end of the area must be capable of being shaded from direct light from the inside or outside of the building. A light framework tunnel may be constructed as an alternate method of shading the screen if other means are not adequate. A movable

tunnel should be covered with an opaque cloth. The screen should be of white colored, non glossy material such as matte white paint or light colored canvas. (See Figure 5 in the back of this handbook.)

b. Positioning of Vehicle. First inspect the vehicle in accordance with the instructions under the heading of "Preparation for Aiming" on page 9 of this handbook. The vehicle must then be positioned so that the front of the lamps are exactly 25 feet from the aiming screen (as determined by a measuring tape) and the longitudinal axis of the vehicle is perpendicular to the plane of the aiming screen. (See Figure 4.)

c. Aiming Reference Lines. A vertical reference line must then be established on the screen by sighting through the rear window and across the hood using any centered body trim or inside rear view mirror as sights, or by an alternate method as indicated in Figure 3. The spacing measured between the lamps and the vehicle centerline can be indicated on the screen to locate the vertical aiming lines directly in front of each lamp. A horizontal reference line must be established in accordance with the procedure described in Figure 3. The lamp aim can now be checked or adjusted in accordance with the applicable diagrams and tolerances shown in Figures 2 through 12. The lamps which are not being checked or adjusted shall be covered with a cloth or opaque material to eliminate confusion of beam patterns.

Mechanical Aimer.

The mechanical aimer, through a system of optical references and leveling devices, mechanically checks lamp alignment using the aiming pads of sealed beam units so equipped. This type of device may be used only on lamps with aiming pads.

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a. Preparation. The lamps to be checked or aimed shall be inspected for chipped or cracked aiming pads. If the pads are damaged, the lamps must be aimed by use of a screen or an optical aimer. The vehicle must be positioned on a flat working area and then inspected as described in "Preparation for Aiming." Mechanical aimers must be adjusted to compensate for slope in the floor. A transit or similar device is part of a complete set of mechanical aimers. When calibrating the aiming device, always follow the manufacturer=s instructions.

Note: The aiming pads on a lamp are referenced to the light pattern of a new bulb. If the light beam is obviously out of adjustment after using a mechanical aimer, readjust the lamp using another method, or replace the bulb and aim mechanically.

b. Aiming Tolerance. The allowable inspection readings are a tolerance permitted for vehicle inspection purposes only. Readings beyond the indicated tolerances shall require adjustment to the correct aim. No deviation is permitted if the headlamp requires adjustment.

c. Aimer Calibration. The mechanical aimers should be calibrated on a periodic basis per manufacturer=s instructions or whenever the aimers have been dropped. This procedure is described in the instruction manual supplied with the aimer.

Optical Aimer.

This device shortens the 25 foot distance by means of a lens and projects the beam pattern on a screen inside the aimer. As in the case of the aiming screen, an optical aimer is capable of aiming all types of headlamps and auxiliary lamps.

a. Preparation. The vehicle and aiming machine must be positioned on a flat working area. This working area must be on one continuous plane, free of depressions, center drains and surface irregularities. The vehicle can then be inspected as described in the section, "Preparation for Aiming."

b. Slope Allowance. The slope of this area shall then be measured and preset into the machine. The machine can then be aligned with the vehicle and the lamp can be aimed or checked in accordance with the applicable data in Figures 6 through 12.

c. Aimer Calibration. The optical aimer should be calibrated on a periodic basis per manufacturer=s instructions or whenever the aimer has been knocked over or hit. This procedure is described in the instruction manual supplied with the aimer.

Vehicle Headlamp Aiming Device (V.H.A.D.)

On vehicles equipped with V.H.A.D., (a bubble in liquid vial device that is attached to the vehicle=s headlamp and used for aiming purposes), aiming and verification of aim may be performed on the vehicle if the vehicle is placed on a level surface. The level surface may be four level pads that the vehicle tires rest on. Preparation of the vehicle is similar to other aiming methods as far as loading and physical condition of the vehicle. This assumes the vehicle has not been damaged in a collision. See the vehicle owner=s manual, or appropriate shop manual.

Aiming Motorcycle Headlamps.

The aiming of motorcycle headlamps must be performed using either an aiming screen

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or optical aiming machine. The motorcycle must be positioned on a flat working area between two guide rails on the floor. These guide rails are to be used to maintain the alignment between the front and rear wheels.

a. **Using Aiming Screen.** If an aiming screen is employed, it must be positioned exactly 25 feet in front of the headlamp and perpendicular to the rails on the floor. The vertical reference line on the screen must be in the same plane as the centerline of the two wheels. The motorcycle must be held in an upright position with the wheel straight ahead and the driver or the driver=s equivalent weight on the seat.

If an optical aiming machine is used, it must be aligned with the guide rails on the floor.

b. **Electrical Supply.** If the electrical supply for the headlamp is a magneto or flywheel generator, the engine must be running at a high idle speed while aiming the lamp.

Final Adjustment Check.

The following procedures are recommended to ensure a positive aim with all types of aiming devices:

a. After each adjustment, being careful not to damage the vehicle, pound the fender lightly with the fist to settle the aiming springs. The aim should then be rechecked.

b. The horizontal aim should be checked after each vertical adjustment and vice versa.

c. The last turn of the adjusting screws should be in a clockwise or inward direction. This will eliminate the backlash

which occurs in the aiming adjustment mechanism.

d. The aim of a new replacement sealed beam unit headlamp should always be checked as the aiming is controlled through the lens and aiming pads and not by the seating surface adjacent to the housing.

e. It is very important to recheck headlamp aim after reinstallation of bezels or other trim around headlamps. Improperly fitted or damaged items can drastically change headlamp aim.

Proper Mounting.

Taillamps, stop lamps, turn signal lamps, and reflex reflectors must be mounted so the axis of the light beam is parallel to the longitudinal axis of the vehicle. The mounting of lamps and reflectors directly on curved or sloping surfaces of a vehicle is not satisfactory when the devices cannot be properly aimed. In these cases, the brightest portion of the light cannot be seen by other drivers, and the effectiveness of the device is greatly decreased. Reflectors or lamps mounted on flaps, hinges or flexible hangers are not permitted unless these devices remain rigidly in a vertical position while the vehicle is in motion. Lighting equipment that has special mounting instructions or "TOP" marks must be mounted in accordance with these directions to achieve the intended design performance.

Lamps designed for a different vehicle can be used, but they must meet the requirement for the vehicle on which they are used. On vehicles 1968 and older, tail lamps must be visible at a minimum distance of 500 feet. Tail lamps on vehicles 1969 and newer must be visible at a minimum distance of 1000 feet. The

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lamps must be mounted at the same angle to the roadway and the centerline of the vehicle as on the original vehicle.

Laws and Regulations Relating To Lamp Adjustment.

It is the technician's responsibility to know applicable laws relating to lamp adjustment.

Many relevant sections are located in the California Vehicle Code and the California Code of Regulations, Titles 13 and 16. This information is also located in the Laws and Regulations Handbook available free of charge from the Bureau of Automotive Repair. The Vehicle Code is also available on the Internet at www.leginfo.ca.gov and the Laws and Regulations may be found at www.oal.ca.gov.

Headlamp Adjustment Specifications.

Vehicle headlights shall be adjusted in accordance with the Society of Automotive Engineers (SAE) Lighting Inspection Code, J599, and SAE Performance Requirements for Motor Vehicles, J1383, or the most current SAE standard. SAE J581 describes auxiliary driving lamps; front fog lamps are covered by SAE J583.

High Beam Lamps. The correct mechanical aim for high beam headlamps at 25 feet is 0 vertical and 0 horizontal. The mechanical inspection limits for high-beam headlamps shall be 10 cm (4 in) up to 10 cm (4 in) down and 10 cm (4 in) left to 10 (4 in) right.

Low Beam Lamps. The mechanical aim inspection limits for the low-beam headlamp or the low beam of dual beam headlamps at 25' shall be 10 cm (4 in) left to 10 cm (4 in) right. The vertical inspection limits are based upon the height of the vertical center of the headlamp from the ground as noted in the chart below.

Visual and optical headlamp aiming.

High Beam Lamps. The center of the high intensity zone of the lamp must be from 10 cm (4 in) up to 10 cm (4 in) down from the horizontal center line of the lamp and, from 10 cm (4 in) left to 10 cm (4 in) right of the vertical line of the lamp on a screen at 25 feet.

Low Beam Lamps. The inspection limits in the vertical direction for low beam headlamps or the low beam of a dual beam headlamp, shall be determined by the height of the vertical center of the headlamp from the ground as noted in the chart below. In the horizontal direction, the left edge of the high intensity zone shall be located from 10 cm (4 in) left to 10 cm (4 in) right of the vertical centerline of the lamp. The viewing screen shall be located 7.6 m (25 feet) in front of the vehicle.

Vertical Beam Aim Guidelines - Low Beam

The nominal vertical aim position on lower beam headlamps shall be adjusted based upon the headlamp mounting height, from the ground to the light source center of the headlamp, per the chart below.

Headlamp (centerline) Mounting Height	Nominal Vertical Aim	Aim Inspection limits for Vertical Aim
22 to 36 Inches (56 to 90 cm)	0" Vertical	4" up, 4" down (10 cm up, 10 cm down)
36" to 48" (90 to 120 cm)	2" down (5 cm)	2" up, 6" down (5 cm to 15 cm)
48" to 54" (120 to 140 cm)	4" down (6.4 cm)	1.5" up to 6.5" down (4 cm to 16.5 cm)

Diffused Lighting.

Diffused lighting is permissible if it meets the requirements of the California Vehicle

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Code. Examples of diffused lighting are neon type colored lights mounted in fender wells or under vehicles.

Any diffused nonglaring light shall not display red to the front, but may display other colors. A diffused nonglaring light shall not resemble nor be installed within 12

inches or in such position as to interfere with the visibility or effectiveness of any required lamp, reflector, or other device upon the vehicle.

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LAMP MOUNTING CHART (Vehicles 80" or Less in Width)* X = Required Vehicle Year

Item	Cond/Def	Height -Inches		'40	'58	'65	'69	'71	'75 -	Veh. Code
		Min	Max							Ref. Number
1. Headlamps	A & B	22	54	X	X	X	X	X	X	24400
2. Taillamps	A & B	15	72	X	X	X	X	X	X	24600
3. Stoplamps	A & B	15	72	X	X	X	X	X	X	24603
4. License Lamps	Def. #4	N/A	N/A	X	X	X	X	X	X	24601
5. Parking Lamps	N/A	N/A	N/A							24800
6. Reflex Reflectors	A, B & C	15	60			X	X	X	X	24607
7. Backup Lamps	B	N/A	N/A				X	X	X	24606
8. Turn Signal Lamps	A & B	15	N/A		X	X	X	X	X	24951
9. Sidemarkers Lamps	A, B & C	15	N/A							25100
10. Intermediate side Marker Lamps	A & C	15	60							25100/ 25102
11. Intermediate Side Marker Reflectors	A & C	15	60							24608
12. Fog Lamps	A & B	12	30							24403
13. Passing Lamps	A & B	24	42							24402(b)
14. Auxiliary Driving Lamps	A & B	16	42							24402(a)
15. Authorized Emergency Veh Lamps	E	N/A	N/A	X	X	X	X	X	X	25252
16. High Beam Indicator	Def. 16	N/A	N/A	X	X	X	X	X	X	24408
17. Daytime running lights	Def. 17	N/A	N/A			X	X	X	X	25109

*For vehicles over 80" in width, see California Vehicle Code (CVC) Sections 24607, 24608, and 25100 for additional requirements.

Conditions

- A. All heights are measured from the level road surface to the center of the lamp or reflector on the vehicle at curb weight. (See Title 13, CCR, Section 692(a) for minimum installed width requirements.)
- B. All items will be installed at the same height, one on each side of the vertical centerline as far apart as practicable.
- C. All items mounted on vehicle sides will follow "B" above.
- D. All aftermarket lamps and reflex reflectors should be mounted with the plane of the lens perpendicular to the surface of the roadway.
- E. Every authorized emergency vehicle shall be equipped with at least one steady burning red warning lamp visible from at least 1,000 feet to the front of the vehicle to be used as provided in this code. In addition, an authorized emergency vehicle may display revolving, flashing, or steady red warning lights to the front, sides, or rear of the vehicle. Vehicles must comply with the VC and CCR, Title 13.

Definition

- Item 1. Dual/single headlamp.
- Item 2 & 3. One on each side required after January 1, 1958.
- Item 4. At rear license plate to illuminate and make legible from a distance of 50 feet.
- Item 6. On rear, one each red. On each side, one red, as far to the rear and one amber as far to the front as practicable, required after January 1, 1965. Area reflectorizing material may be used in lieu of the reflectors required or permitted.
- Item 7. On rear, one or more, required after January 1, 1969.
- Item 8. At or near the front, one amber. On each side, on the rear, one red or amber each side required after January 1, 1958. If manufactured after January 1, 1969, shall not be mounted lower than 15".
- Item 9. On each side, one red as far to the rear and one amber as far to the front as practicable.
- Item 10 & 11. On each side, one amber located at or near the midpoint between the front and rear sidemarkers lamps/sidemarkers reflectors.
- Item 12, 13, 14. Optional equipment, condition "D."
- Item 16. Every new motor vehicle registered in this state after January 1, 1940, which has multiple beam road lighting equipment shall be equipped with a high beam indicator per VC 24408.
- Item 17. Equipped with two white or amber running lamps mounted on the front, one on each side, which shall not be lighted during darkness except while the vehicle is parked.

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CHAPTER 6 - CLEARANCE OF ENFORCEMENT DOCUMENTS

Certification of Specific Defects.

After correcting specified defects, official lamp adjusters shall certify that defects indicated on citations or other enforcement forms have been corrected. The enforcement form shall include the date of correction, station and adjuster license numbers, and the adjuster's signature.

Unapproved Devices or Defects.

The adjuster shall advise the vehicle owner or operator of any unapproved devices or any defective conditions present or likely to occur in the future which have come to his or her attention in conjunction with inspection of the vehicle and correction of specified defects.

Additional Repairs.

Failure of the owner or operator to approve such additional repairs as may be indicated by such inspection shall not authorize the adjuster to defer certification of correction of those specific defects listed on the enforcement form.

Signing Enforcement Forms.

Only licensed adjusters employed at official adjusting stations may sign enforcement forms as official adjusters. The adjuster's license number and official station number shall be included with his or her signature.

When a customer asks for a Certificate of Lamp Adjustment in conjunction with clearance of an enforcement form, the adjuster may, if requested, inspect and certify only the portion of the lighting system specified as defective on the

enforcement form. Where the entire system has not been tested or inspected or one or more defects have been corrected, the certificate shall indicate which tests or inspections have been performed, or which defect or defects have been corrected.

After correcting specified defects, official lamp adjusters shall certify that defects indicated on citations or other enforcement forms have been corrected. The Certificate of Lamp Adjustment shall be valid for 90 days after its issuance to a customer.

Finding of Other Defective Conditions.

The adjuster shall inform the customer of any other defective conditions present or likely to occur in the future which have come to the adjuster's attention in conjunction with inspection of the vehicle and correction of specified defects.

If the customer does not authorize additional repairs to correct other defects found during the inspection, the adjuster shall certify that only the specific defects listed on the enforcement form have been corrected.

CHAPTER 7 - CERTIFICATION OF LAMPS ON SPECIALLY CONSTRUCTED OR RECONSTRUCTED VEHICLES

Department of Motor Vehicles Requirements.

Specially constructed and reconstructed vehicles must be inspected and certified for compliance with lamp, brake, and emission control regulations before they can be registered.

Inspection Procedures.

To issue a lamp certificate, an adjuster

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should inspect a vehicle as follows:

a. Be sure that the vehicle is equipped with all required lighting devices (such as headlamps, taillamps, stoplamps, reflectors, license plate lamps, turn signals, backup lamps, etc.) in accordance with the Vehicle Code for the model year of the vehicle. Be sure that all devices are operating properly, are installed at the proper angle and height, and are correctly aimed, as applicable. Refer to the lamp mounting chart on page 15.

(1) Turn signal lamps visible to approaching or following drivers shall flash in unison, except that a turn signal consisting of two or more units mounted horizontally may flash in sequence from inboard to outboard. The lamps may be either extinguished simultaneously or lighted simultaneously. Turn signal lamps shall flash at a rate of 60 to 120 flashes per minute.

b. Verify that the headlights are correct for the vehicle being inspected. For example, some vehicles have two headlights while others may have four. Headlight types will vary from one vehicle to another. Some will have the 7" sealed beams, 5" sealed beams, or rectangular sealed beams, while others are equipped with halogen sealed beams or bulbs, xenon, super plasma, or high intensity discharge bulbs. Ensure that sealed beams and/or bulbs are D.O.T. approved.

Two 7" sealed beams comprise a complete headlamp system, while four 5" sealed beams are needed to have a complete system. A vehicle with one dual-beam 5" lamp on each side has only half of the required high beam system.

c. Headlamps shall be mounted as specified in FMVSS 108 and as follows:

(1) Spacing. Headlamp units installed after November 15, 1975, shall not be closer to the centerline of the vehicle than 12 inches (30 cm), measured from the center of the lens, except on motorcycles and motorized bicycles.

d. Inspect add-on or aftermarket reflectors and auxiliary or driving lamps. Such lamps are often mounted in ways that are in conflict with the Vehicle Code. When you inspect a specially constructed or reconstructed vehicle, motorhome, or trailer, be sure that the auxiliary lamps (such as clearance sidemarkers) are mounted parallel to the longitudinal axis of the vehicle to ensure proper light distribution. If you have questions about abnormal installations, consult the California Vehicle Code, California Code of Regulations, Title 13 and Title 16, or contact your local Bureau of Automotive Repair office. Information is also available on the Internet at the following web sites:

Title 13, California Code of Regulations,
www.oal.ca.gov/

Title 16, California Code of Regulations,
www.oal.ca.gov/

California Vehicle Code,
www.leginfo.ca.gov/

CHAPTER 8 - FILLING OUT THE CERTIFICATE OF ADJUSTMENT - LAMP ADJUSTMENT

Use the example below to fill out the Certificate of Adjustment - Lamp Adjustment. Remember, the certificate is an official document and must be filled out clearly and legibly. Call the local BAR field

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office if additional information is required.

Certificate of Adjustment Valid for 90 Days

The Official Certificate of Adjustment is valid for 90 days from the date of issuance. Certificates must be signed, dated, and issued on the date of inspection.

This information is listed on the bottom of the certificate, however, consumers often call BAR to inquire about this information. As a matter of convenience, consumers should be advised that the certificate is valid for 90 days at the time the certificate is issued.

Emergency Vehicle Permits.

When a lamp adjustment certificate is issued to an applicant for an authorized emergency vehicle permit, the certificate shall certify that the vehicle has been inspected and that all lamps and related electrical systems meet all requirements of the Vehicle Code, Title 13 and Title 16 of the California Code of Regulations, and that all lamps capable of adjustment are properly adjusted.

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Write the vehicle identification number or the registration number. (If the vehicle is a motor home, the DMV will have registered it by the identification number of the coach manufacturer, rather than the chassis manufacturer.)

Write the name of the registered owner or, if the vehicle is in the possession of a dealer, the name of the dealer.


Check the box(es) indicating the purpose of the Lamp inspection.

Check the box(es) indicating the lamp equipment inspected or repaired.

CERTIFICATE OF ADJUSTMENT - LAMP ADJUSTMENT



STATE OF CALIFORNIA
DEPARTMENT OF CONSUMER AFFAIRS



BUREAU OF
AUTOMOTIVE
REPAIR

LA 0000000

VEHICLE LICENSE NO.

VEHICLE IDENTIFICATION OR REGISTRATION NO.

MAKE

YR. MODEL

NAME OF REGISTERED OWNER

Purpose of Certification:

☐ Lamp Adjustment

☐ Approved Lighting Equipment

☐ Lighting System Repair

☐ Clearance of Enforcement Document # _____

☐ Registration of Reconstructed Vehicle

	Insp.	Adj.	Repair
Headlights			
Driving Lights			
Passing Lights			
Fog Lights			

TYPE OF AIMER USED

Mechanical ☐ Optical ☐ Screen ☐

Boxes Checked Below Identify Additional Lamp Equipment Inspected or Repaired

<input type="checkbox"/> Clearance Lamps	<input type="checkbox"/> Rear Lamps	<input type="checkbox"/> Identification Lamps
<input type="checkbox"/> Lamp Type Signal	<input type="checkbox"/> Stop Lamps	<input type="checkbox"/> Side Lamps
<input type="checkbox"/> Semaphore Type Signals	<input type="checkbox"/> Reflectors	<input type="checkbox"/> Spot Lamps
<input type="checkbox"/> Warning Lamps	<input type="checkbox"/> License Plate Lamps	<input type="checkbox"/> Back-up Lamps

All items checked above are of an approved type and I have performed the applicable inspection, adjustment, or repair as specified by the Bureau of Automotive Repair and the vehicle manufacturer, and in accordance with Title 13 and Title 16 of the California Code of Regulations, the Vehicle Code, and the Business and Professions Code. I hereby certify under penalty under the laws of the State of California that the above is true and correct.

ADJUSTER'S SIGNATURE

DATE OF ISSUANCE

ADJUSTER'S LICENSE NO.

STATION LICENSE NO.

This certificate must be issued on the date of inspection and is valid for 90 days after issuance

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Write the make and the year model. (If the vehicle is a motor home, write the year model of the coach, rather than of the engine or chassis.)

Check the box(es) indicating inspection, adjustment or repair.

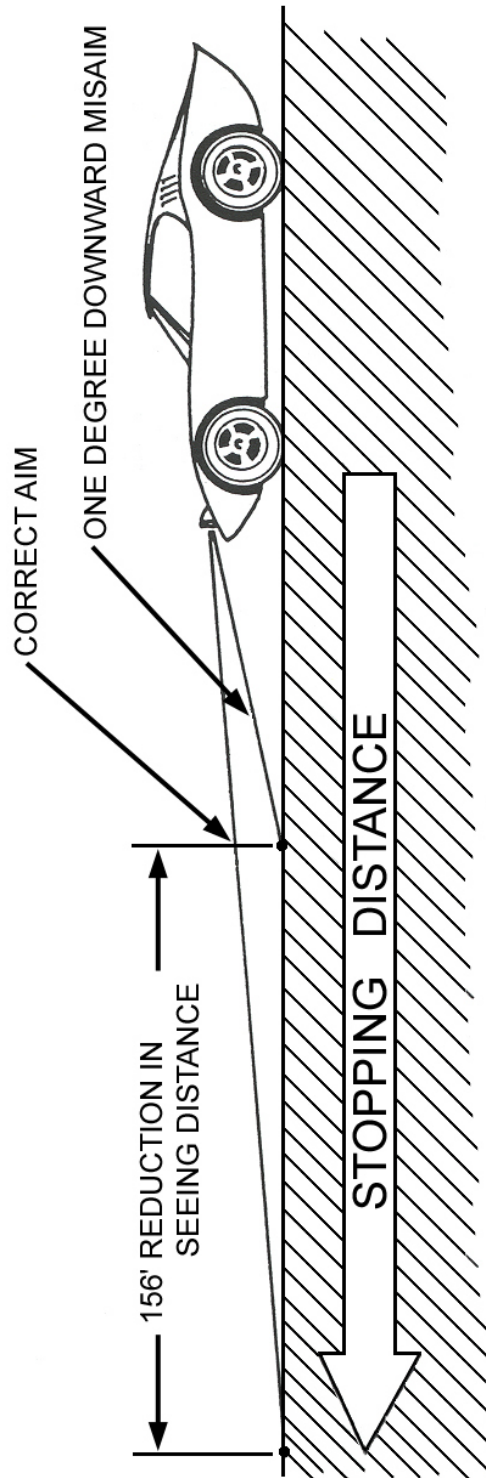
Check the box indicating the type of aimer used.

Sign the certificate. Write down the date, your adjuster's license number, and the station's lamp license number.

Give the white copy to the customer. Retain the pink copy in the certification book. It must be kept available for at least three years from date of issue.

Figure 1

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Effect of Headlamps Aimed Too Low
Figure 2

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- A.** Sighting across the top of two yard sticks will establish a reference line 36 inches above the working surface on which the vehicle is placed.
- B** Reference marks or pins should then be located above and below the 36 inch reference on one inch intervals. The marks should start 30 inches below this reference line (equal to 6 inches above the working surface) and go to 24 inches above the reference line (equal to 60 inches above the working surface).
- C.** The height of the lamp centers can then be measured above the working surface and the horizontal reference line can be placed at the corresponding mark on the screen for each vehicle inspected.

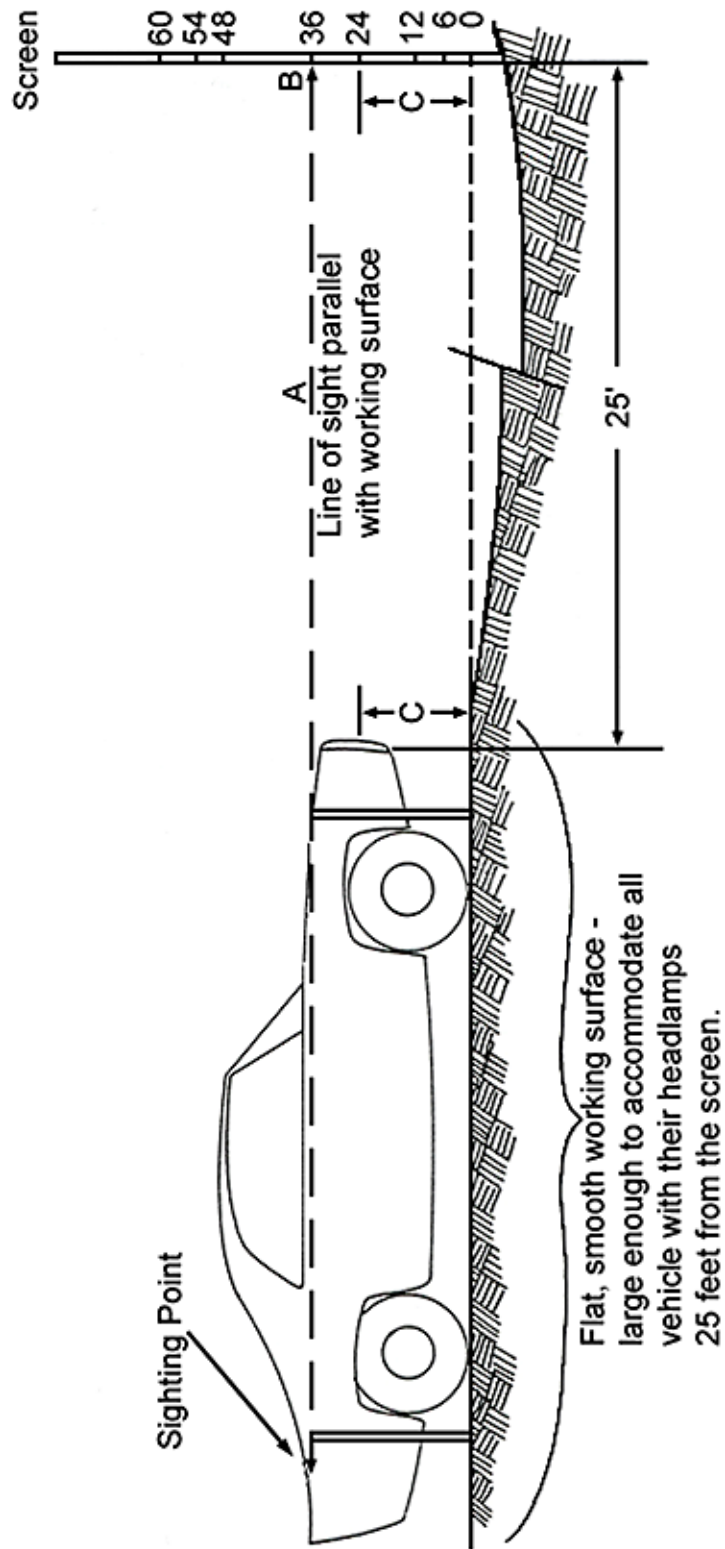


Figure 3

**BUREAU OF AUTOMOTIVE REPAIR
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When a vehicle does not have an identifying feature to establish a centerline, the following procedure may be used to find center:

- A. Measure across the engine hood and mark the center. A small magnet is a good marker; however, be careful not to scratch or damage the vehicle's paint.
- B. Follow the same procedure on the rear deck of the vehicle.
- C. Position the vertical reference line on the aiming screen using the objects as sights.

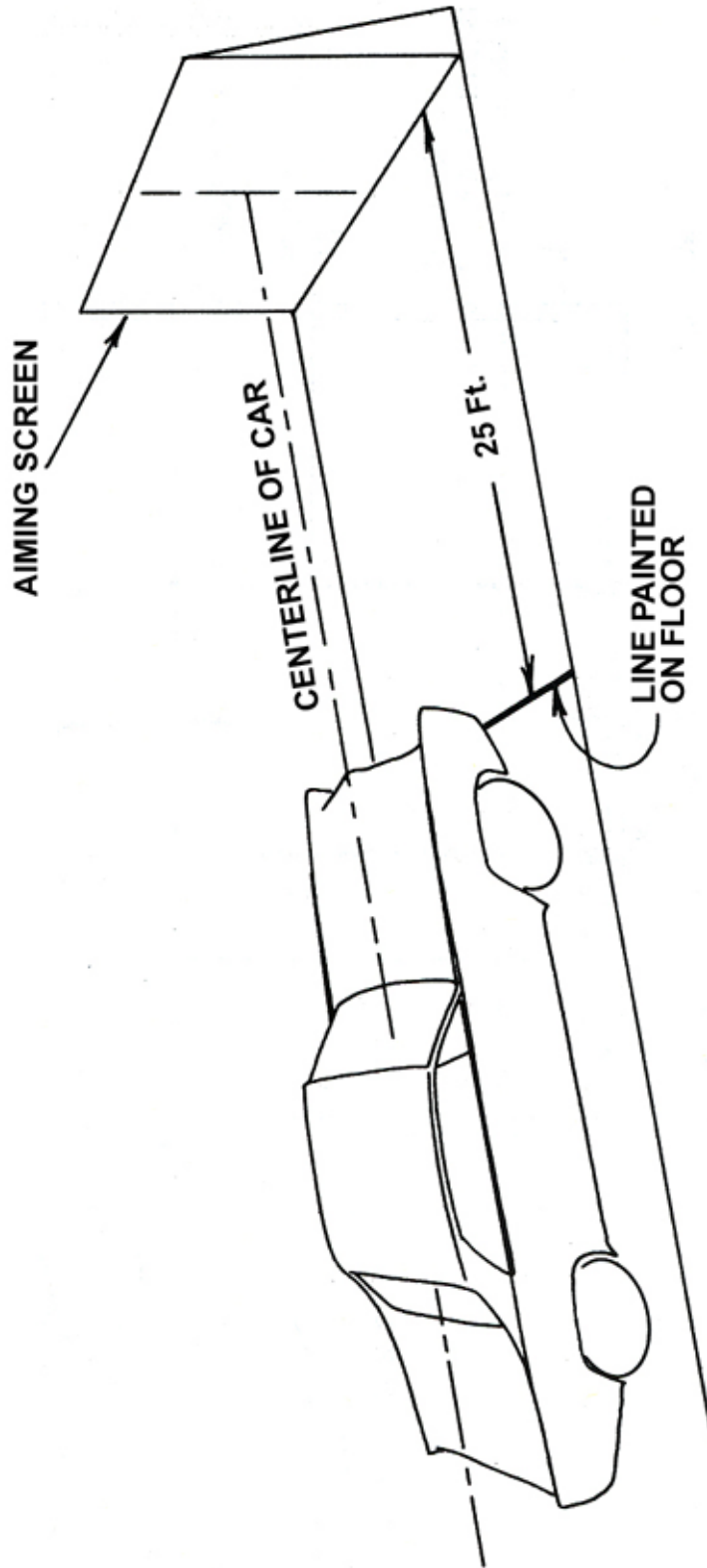


Figure 4

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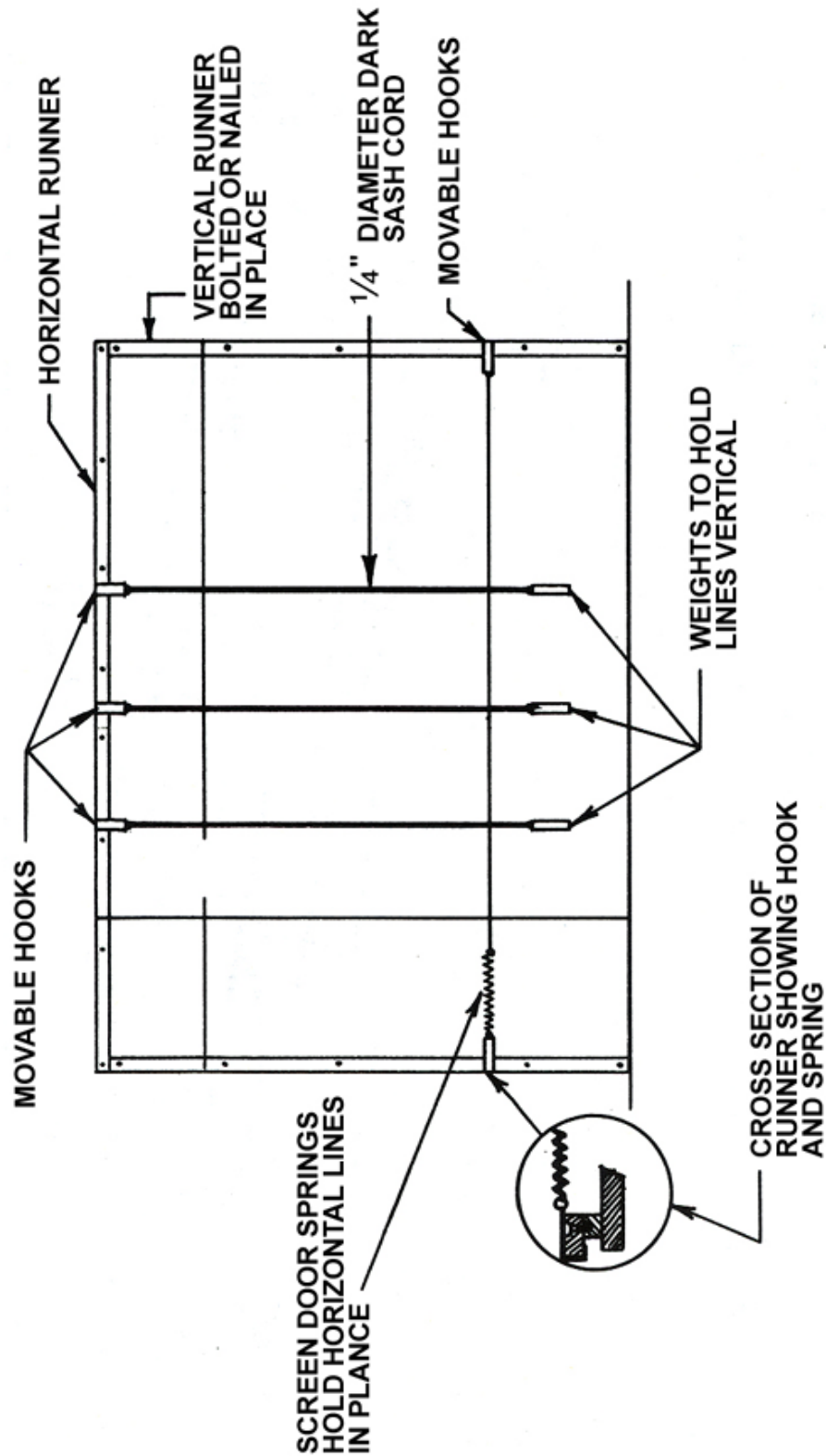


Figure 5

**BUREAU OF AUTOMOTIVE REPAIR
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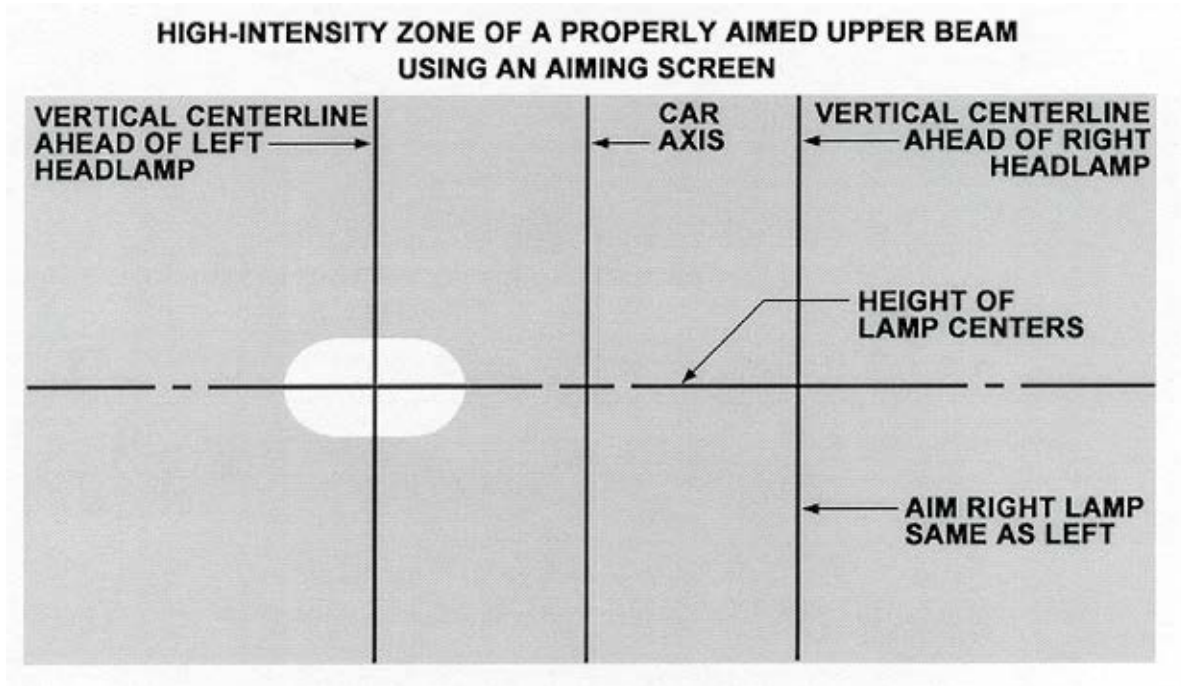


Figure 6

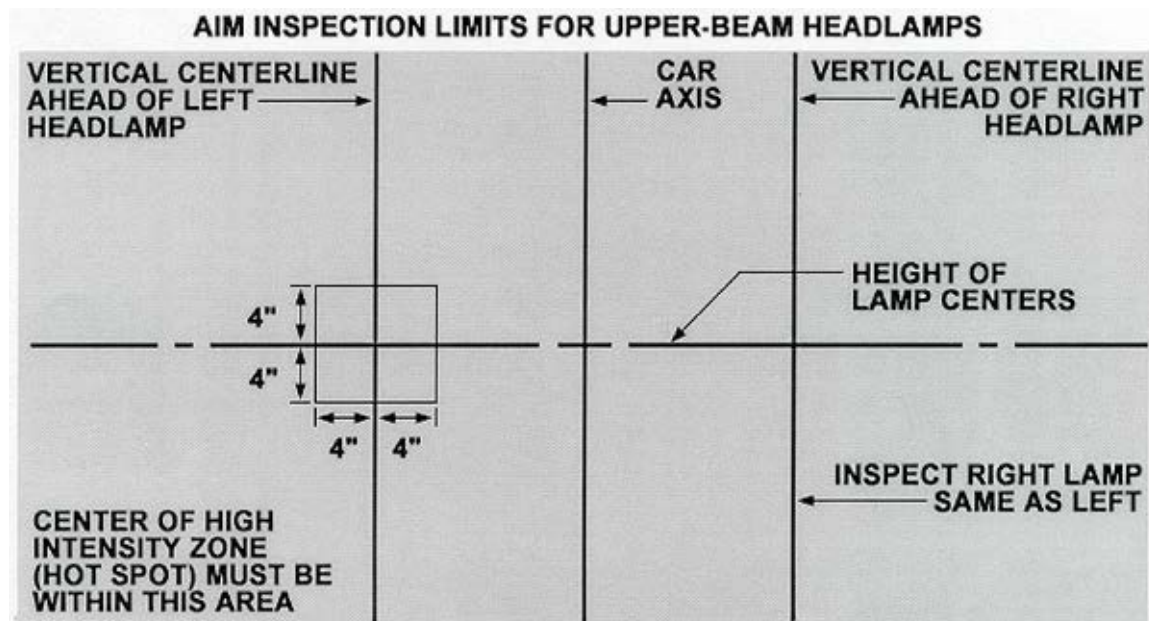


Figure 7

BUREAU OF AUTOMOTIVE REPAIR HANDBOOK FOR LAMP ADJUSTING STATIONS

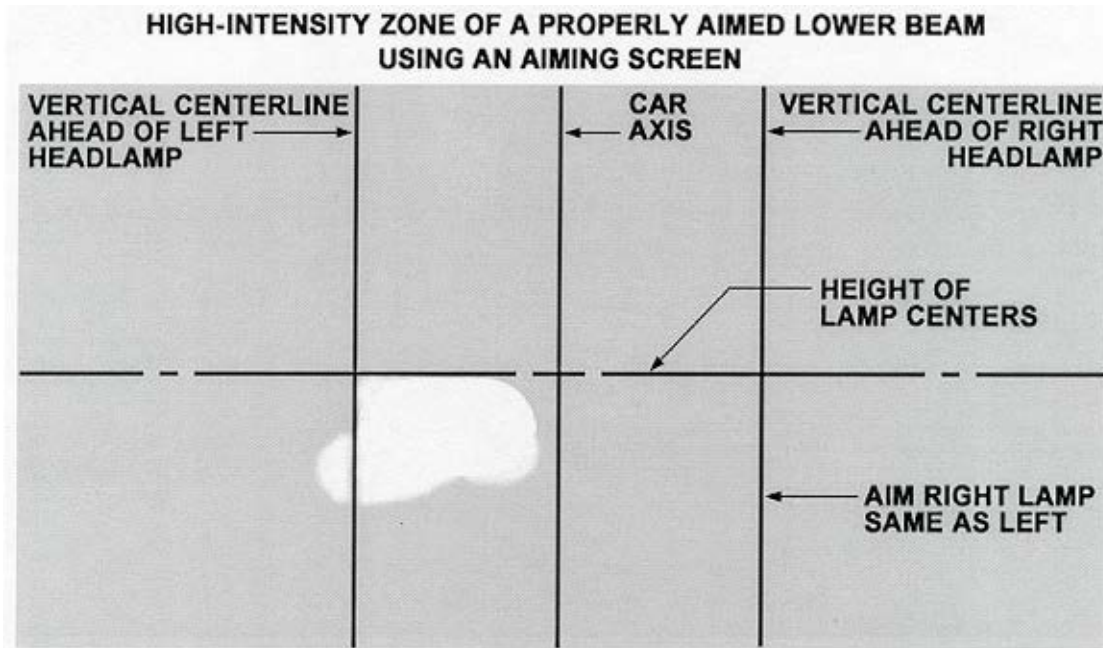


Figure 8

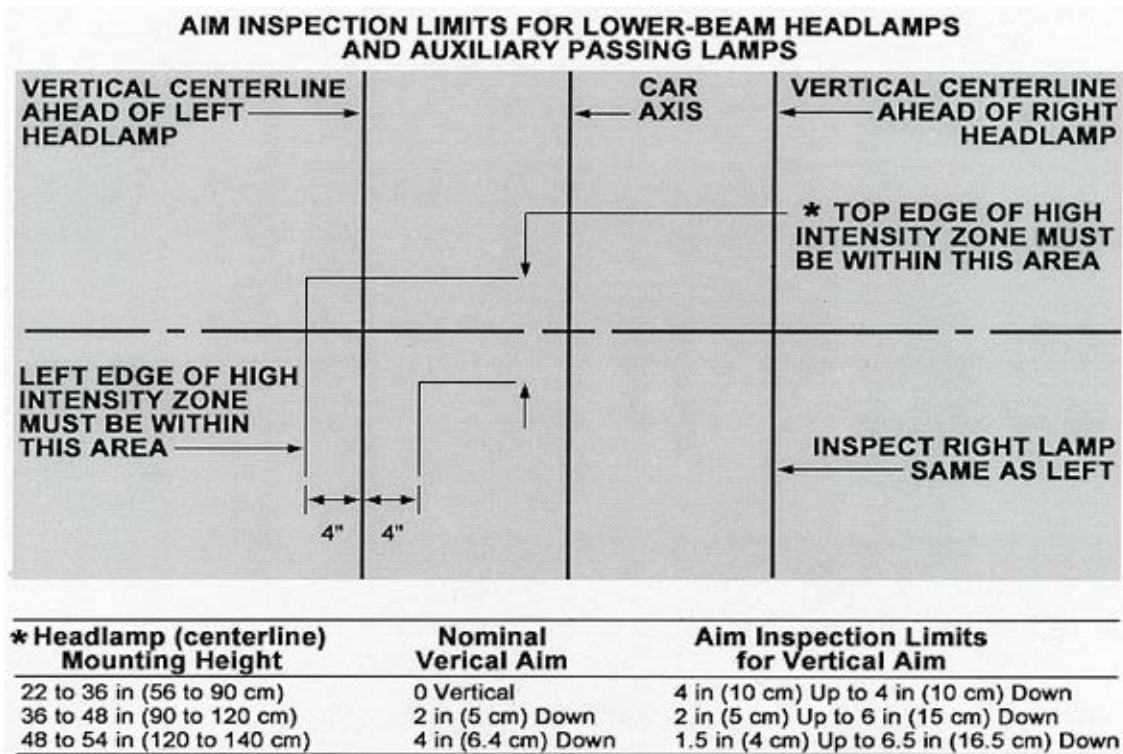


Figure 9

**BUREAU OF AUTOMOTIVE REPAIR
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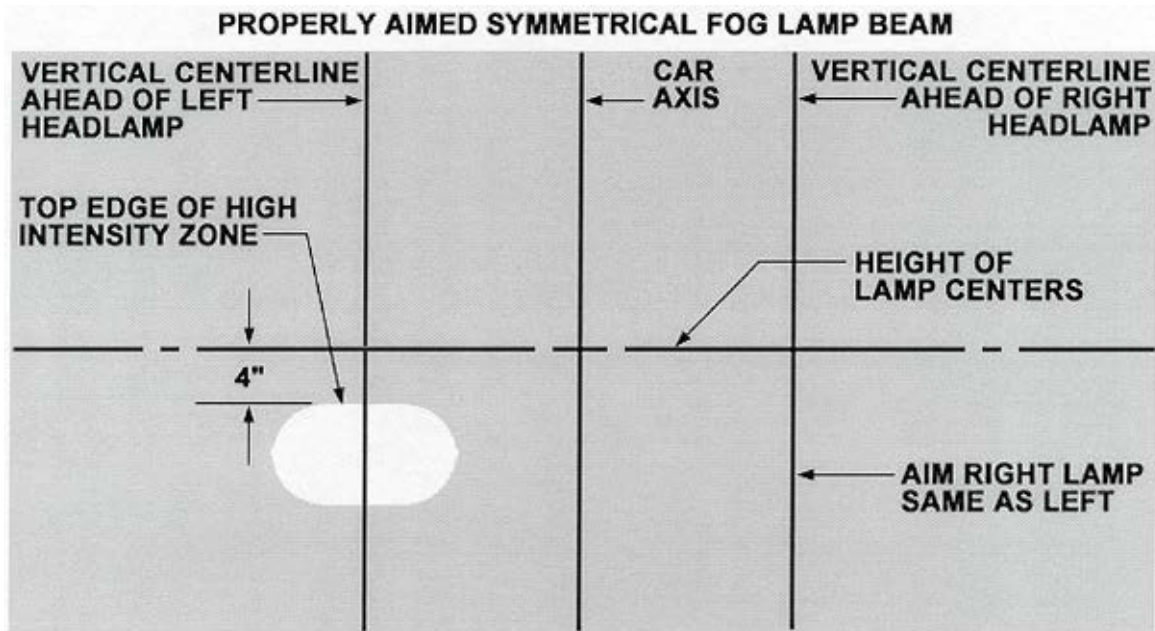


Figure 10

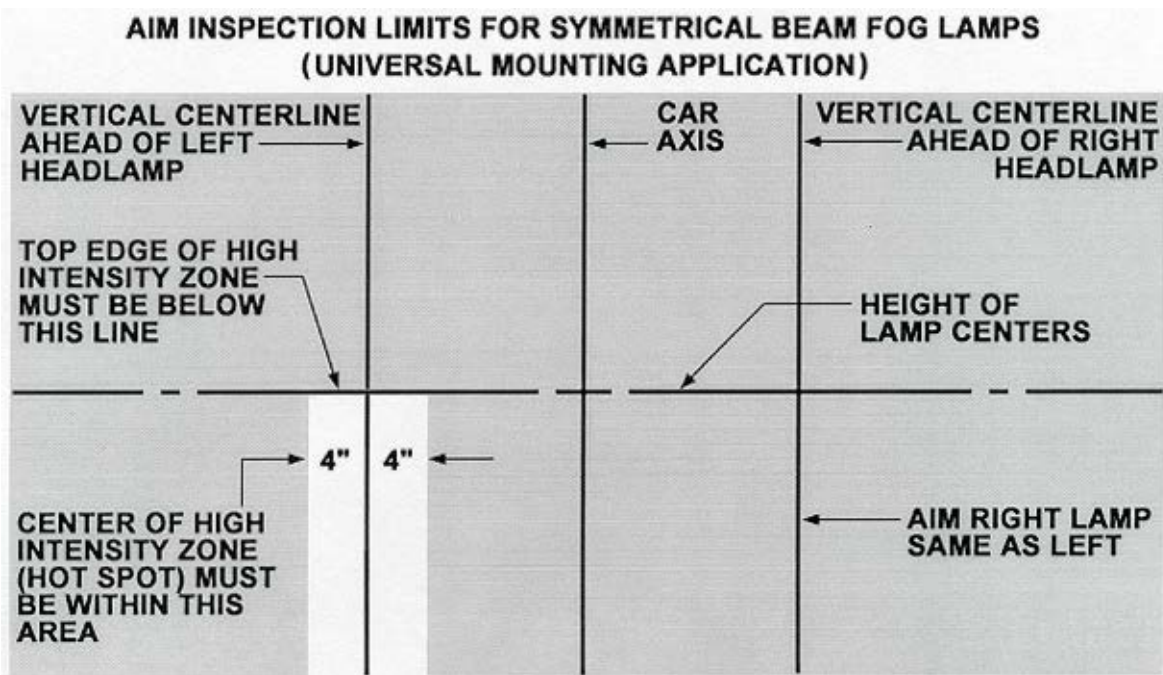


Figure 11

**BUREAU OF AUTOMOTIVE REPAIR
HANDBOOK FOR LAMP ADJUSTING STATIONS**

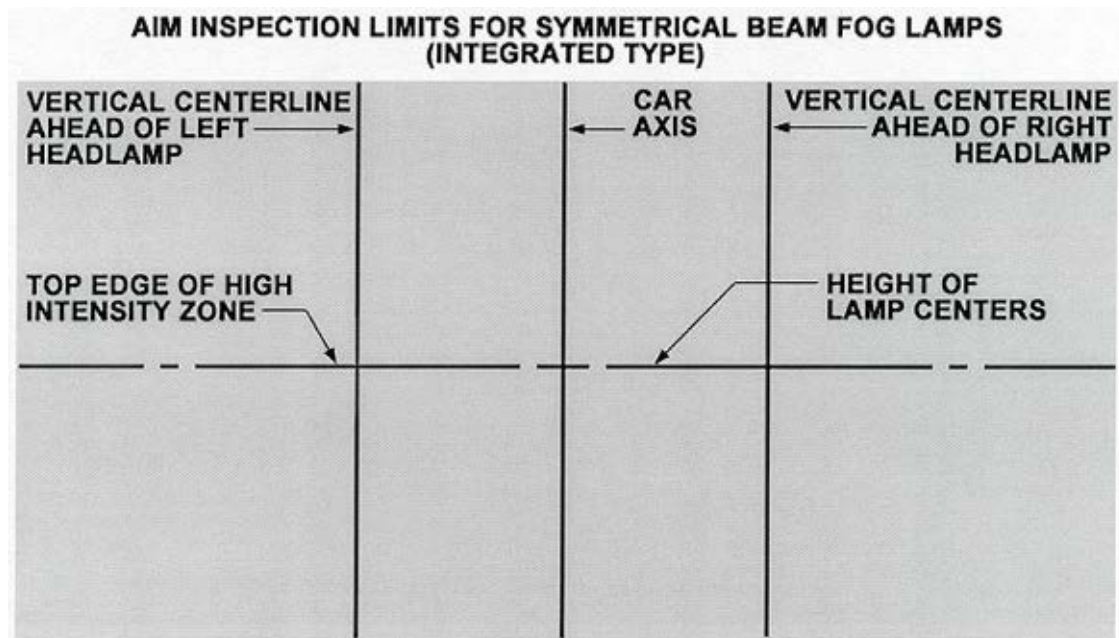


Figure 12