

Inspection & approval protocol for vehicle lamps, lights, and reflectors

prepared for BCMoT by Daniel Stern Lighting, June 2009

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**Inspection & approval protocol for vehicle lamps, lights, and reflectors
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Introduction

This illustrated document explains the requirements and specifications for all lamps, lights, and reflectors on motor vehicles:

- What devices are permitted, required, and prohibited
- How they must be installed and how they must function
- How to check their installation, bulbs, operation, and adjustment.

This information will help law enforcement officers, vehicle inspectors and registrars, and insurance assessors determine whether a vehicle's lighting equipment is adequate, safe, appropriately adjusted, and performing correctly.

The first part is a series of step-by-step inspections and tests to see if a vehicle has a complete set of approved lamps, lights, and reflectors functioning properly. If you only need to check particular lighting components on a vehicle, use the Table of Contents to find the components you want to check, and go directly to the indicated page.

The second part is a step-by-step guide to checking and adjusting the aim of headlamps and auxiliary lamps to provide the driver with legal, safe, and effective lighting after dark and in bad weather, without unsafe glare.

The third part is a reference section with a detailed presentation of lamp, light, and reflector function markings; information on detecting counterfeit lamps, and beam pattern diagrams. Go directly to this section to check whether a particular lighting device's markings are legitimate or if it performs all the needed functions, or to make a fast assessment of whether a vehicle's headlamps produce a beam pattern safe and legal for use in Canada.

All images in this document are sized to remain clear and sharp even if you zoom in on them with your PDF reader.

Validating lamps, lights and reflectors

Validating lights and reflectors

Signal lights and reflectors make the vehicle and its driver's intent clearly visible to other road users. For example, brake lights show the driver's intent to slow or stop. Turn signals show the driver's intent to change lane or direction. Parking lights, sidemarkers, daytime running lights, and tail lights show the vehicle's presence, position, size, and direction of travel. Reflectors make a vehicle with switched-off or failed lights safely visible after dark. This is in contrast to the vehicle's forward illumination lamps, which light the driver's way forward at night. Multi-function combination devices may contain a mix of forward illumination lamps, signal lights, and reflectors.

Validating a vehicle's lights and reflectors means checking that

- all required ones are present,
- all are in good condition,
- all function correctly,
- all are mounted properly, and
- all are of approved types.

Installed devices must function

All lights and reflectors installed on the vehicle must function, even optional ones. When each lamp is activated, most or all of its lens area should light up.

Do all installed lights function?

Activate and observe all the vehicle's lights. Are there any lights installed on the vehicle that do not function, or on which most of the lens area does not light up?

Yes: The vehicle fails.

No: Proceed to the next test.

Check red lights

If a lamp without a red inner or outer lens is seen to emit red light, it is likely to have red bulbs, many of which are not approved. Red light may be produced by colourless bulbs with red inner or outer lenses, or by factory-installed red LEDs. Red light may not be produced by red bulbs unless the bulbs are either permanently installed in a sealed light unit or are marked with a European code mark such as (E1)-the actual number after the E doesn't matter.

Are all red bulbs of an approved type?

Remove and inspect the bulbs from all lamps that produce red light, but don't have a red inner or outer lens. Do you find a red bulb without an E mark?

Yes: The vehicle fails.

No: Proceed to the next test.

Check for proper bulbs

All lights and reflective devices must be equipped with bulbs of the proper type, colour and power. It is not permitted to install “LED bulbs” into a socket or light intended to use regular filament bulbs. If a lamp is seen to emit only a small point of light near the centre of the lens, without most of the lens lighting up evenly, it is likely to have had “LED bulbs” installed.

Are proper bulbs installed?

Observe all operating lamps. Does any lamp, when activated, show only a small point of light rather than lighting up most of the lens area?

No: Proceed to the next test.

Yes: Remove the bulbs from each lamp showing only a small point of light when activated.

Does each bulb contain one or two filaments in one glass globe?

No: The vehicle fails.

Yes: Re-inspect the light for degraded bulb reflectors or other causes of poor performance. Repair or replace degraded lights. European P21W bulbs can be replaced with brighter P3497 bulbs, and European P21/5W bulbs can be replaced with brighter P3496 bulbs, to increase lamp performance. If poor performance persists, contact provincial authority for final determination.

Check for white to rear, red to front

All forward-facing lights and reflectors must produce and/or reflect only white, yellow, or amber light. The only lights that may shine white light to the rear are the reversing (back-up) lights and the licence plate lights. No other rear lights or reflectors may produce or reflect white light.

Does any forward-facing light or reflector produce or reflect light other than white, yellow, or amber?

Yes: The vehicle fails.

No: Does any rear light or reflector, other than reversing and licence plate lights, produce or reflect white light?

Yes: The vehicle fails.

No: Proceed to the next test.

Check condition of lights and reflectors

Lenses and reflectors must not be cracked or broken. Repairs with coloured tape or other temporary materials are not acceptable. Lenses that are visibly crazed, clouded, fogged, faded, or otherwise degraded with age are not acceptable and must be refurbished or replaced before re-inspection. Bulb reflectors must be bright and shiny; reject lights with corroded, darkened or peeling bulb reflectors. Devices must not contain water. All lights and reflectors must be securely and properly mounted to the vehicle with appropriate hardware; glue or other adhesive mounting is not acceptable. All weather seals must be intact. Lenses may not have any paint, coating, or cover that darkens the original lens colour or reduces the amount of light emitted. Lights and reflectors **originally** manufactured with dark or specially-coloured lenses are permitted as long as the device emits light of the correct colour and intensity.

Have any temporary materials been applied to any light or reflector, such as coloured tape?

Yes: The vehicle fails.

No: Is any light or reflector cracked, broken, crazed, clouded, faded, fogged, or otherwise visibly degraded?

Yes: The vehicle fails.

No: Is the bulb reflector in any light corroded, darkened, peeled, or otherwise degraded?

Yes: The vehicle fails.

No: Does any light or reflector contain water or condensation?

Yes: The vehicle fails.

No: Is any light or reflector mounted insecurely, improperly, and/or with glue or other adhesive?

Yes: The vehicle fails.

No: Are any weather seals missing or damaged?

Yes: The vehicle fails.

No: Has any light or reflector had a cover, paint, or other coating applied that darkens the original lens colour or reduces the amount of light emitted or reflected?

Yes: The vehicle fails.

No: Proceed to the next test.

Check for approved lights & reflectors

Different countries have different regulations governing the design, construction, and performance of vehicle lights and signals. Lights and reflectors meeting any regulation may be manufactured by any company in any country; the type of lights and reflectors installed on a vehicle depend on the laws of the country where the vehicle is registered and driven. All vehicles in Japan, for example, have lights and reflectors conforming to Japanese regulations, no matter where the vehicle was built or by what company.

Lights and reflectors meeting the U.S. SAE/DOT regulations, the European ECE regulations, or the Japanese JIS/JASIC regulations are allowed. So, most original-equipment lights and signals on vehicles from any market are acceptable. However, this does not mean that a vehicle with a lighting and reflector system considered complete in Japan or Europe is acceptable in Canada. Most markets outside Canada do not require sidemarker lights, sidemarker reflectors, centre high-mount brake lights, or daytime running lights. These devices must be added to vehicles not originally so equipped.

Many aftermarket devices do not meet any regulations, so it's important to make sure all lights and reflectors on each vehicle are of an approved type. In this test, you determine whether the lights and reflectors are of a type safe and approved for Canadian traffic. Check every light and reflector on each vehicle.

Do you find the letters DOT and/or SAE permanently marked on or in the light or reflector?

Yes: The light or reflector passes this test. Move on to the next light or reflector, or proceed to the next test.

No: Search for an ECE approval mark that looks like (E5) or [e5] - the actual number after the E or e doesn't matter. Do you find an E-code mark?

Yes: The light or reflector passes this test. Move on to the next light or reflector, or proceed to the next test.

No: Is the light or reflector definitely original equipment on a vehicle type-approved to Japanese regulations for the Japanese market? If you are not sure, compare the equipment on the vehicle to pictures in original sales brochures, parts and service manuals for the vehicle.

Yes: The light or reflector passes this test. Move on to the next light or reflector, or proceed to the next test.

No: Is the light or reflector definitely original equipment on a vehicle certified by its original manufacturer as conforming to U.S. or Canadian Motor Vehicle Safety Standards? If you are not sure, check the driver's doorframe for a safety certification label and compare the equipment on the vehicle to pictures in original sales brochures, parts and service manuals for the vehicle.

Yes: The light or reflector passes this test. Move on to the next light or reflector, or proceed to the next test.

No: The vehicle fails.

Illustrated examples of lens markings

Here are some illustrations of typical lens markings. The letters and number codes are fully described in the Reference section of this document.



ECE marks on multifunction rear lamp

R-S1 means this section of the combination lamp produces tail (R) and brake light (S1) functions

(E4) is the ECE type approval mark.

← means this rear lamp is for the left side of the vehicle.

711 is the type approval number, not relevant to inspection.



U.S. & ECE marks on multifunction rear lamp

SAE precedes the U.S. function markings.

S T I R means the combination light assembly produces the brake (S), tail (T), turn signal (I), and reversing/back-up (R) light functions.

69 means the device is certified to conform to the SAE standards as of 1969 - not relevant to inspection.

(E4) is the ECE type approval mark.

2a means this section of the combination lamp produces the rear turn signal function.

→ means this rear lamp is for the right side of the vehicle.

611 is the type approval number, not relevant to inspection.



ECE marks on front sidemarker light

(E13) is the ECE type approval mark

SM1 means this is a sidemarker light

→ points towards the front of the vehicle when this side-mounted light is properly installed.

07 JK is the vehicle manufacturer's code for what vehicle this light fits, not relevant to inspection.

015 and **0826** are type approval numbers, not relevant to inspection.



Marks on multifunction rear lamp lens

(E13) is the ECE type approval mark.

➔ arrow indicates this rear lamp is for the right side of the vehicle.

3817 is the type approval number, not relevant to inspection.

R-S1 means this lamp produces the tail (R) and brake (S1) light functions.

02 is not relevant.

AR means this lamp produces the reversing (backup) light function.

00 is not relevant.

2a means this lamp produces the rear turn signal function.

01 is not relevant.

DOT and **SAE** mean this lamp conforms to applicable U.S. standards.



Marks on combination rear lamp reflector

These marks are on the lamp reflector, and can be seen by peering through the transparent amber turn signal lens.

(E4) is the ECE type approval mark.

➔ arrow indicates this rear lamp is for the right side of the vehicle

9472 is the type approval number, not relevant to inspection.

2a 01 means this lamp produces the turn signal function (01 is not relevant)

IB 02 means this lamp contains a rear reflector (02 is not relevant)

R-S1 02 means this lamp produces the tail (R) and brake (S1) light functions (02 is not relevant)

SM2 00 means this lamp produces the sidemarker light function (00 is not relevant)

Check presence and colour of lights & reflectors

All required lights and reflectors must be present, and must produce or reflect the right colour of light. All required and optional lights and reflectors must be in good condition and installed correctly. You'll be checking for the presence, position, and colour of all lights and reflectors. Any signal light or reflector that must be installed in pairs (one per side of the vehicle) may be installed in multiple pairs (two per side, three per side, etc.), as long as they are symmetrical in number, type, mounting, colour, and operation.

Depending on when the vehicle was manufactured, there are 9 to 15 signal light and reflector functions required. Activate and check all of the vehicle's signal lights and reflectors against the Required signal lights & reflectors table. Some aftermarket lamps don't produce all the same functions as the original lamps; vehicles so equipped are often missing required functions. Observe each lamp from several angles at a distance of about 2 m (6 ft) to make sure the brightest light shines straight forward or straight rearward, as applicable. Aftermarket or improperly-mounted brake lamps, for example, often shine their brightest light at an angle rather than straight rearward; this is not acceptable.

Vehicles made before 1970 don't need sidemarker lights or reflectors.

Vehicles made before 1990 don't need daytime running lights.

Cars made before 1986 and trucks & vans made before 1994 don't need centre high-mount brake lights.

Does the vehicle have all required lights and reflectors for its date of manufacture?

Yes: Proceed to the next test.

No: The vehicle fails.

Required signal lights & reflectors

Function	Number & position	Colour	Notes
Parking lights (front position lights)	Pair, one at each side of the front of the vehicle, shining light forward	White, yellow, or amber	Brightest light must shine directly forward. May wrap around for front sidemarker light function.
Daytime running lights	1990 and newer: Pair, one per side at the front of the vehicle, shining light forward	White, yellow, or amber	Brightest light must shine directly forward. May dim down for parking light function.
Front turn signals	Pair, one per side at the front of the vehicle, shining light forward	Amber	Brightest light must shine directly forward. May dim down for parking light function.
Front sidemarker lights	1970 and newer: One on left and one on right side of vehicle near front, shining light to the side	Amber	May also flash with turn signals. Parking light may wrap around for sidemarker light function.
Front sidemarker reflectors	1970 and newer: One on left and one on right side of vehicle near front, reflecting light to the side	Amber	
Rear sidemarker lights	1970 and newer: One on left and one on right side of vehicle near rear, shining light to the side	Red	Tail light may wrap around for sidemarker light function
Rear sidemarker reflectors	1970 and newer: One on left and one on right side of vehicle near rear, reflecting light to the side	Red	
Rear reflectors	Pair, one per side or one, full-width, at the rear of the vehicle, reflecting light rearward	Red	
Tail lights (rear position lights)	Pair, one per side or one, full width, at the rear of the vehicle, shining light rearward	Red	Brightest light must shine directly rearward. May wrap around for rear sidemarker function.
Brake lights (Stop lights)	Pair, one per side, at the rear of the vehicle, shining light rearward	Red	Brightest light must shine directly rearward. May dim down for tail light function.
Centre brake light (3rd brake light, CHMSL, Centre High Mounted Stop Light)	1990 and newer (cars), 1994 and newer (trucks & vans): One, mounted centrally, higher than left and right brake lights, facing and shining light rearward	Red	Brightest light must shine directly rearward, may not flash
Rear turn signals	Pair, one per side at the rear of the vehicle, shining light rearward	Amber or red	Brightest light must shine directly rearward. If red, may dim down for tail light function.
Reversing / back-up light(s)	One or pair, at rear of vehicle, shining light rearward	White	Brightest light must shine directly rearward.
Rear licence plate light	One or pair, at rear of vehicle, shining light onto licence plate	White	Must illuminate whole licence plate. May not shine white light directly visible to the rear.
Hazard flashers	Pair at front and pair at rear, one per side, shining light forward at front and rearward at rear.	Front: Amber Rear: Amber or red	Front sidemarker lights or side turn signal repeaters may flash with hazard flashers.



Improper lights: clear rear lamps

This vehicle's original rear lamps have been replaced by all-clear aftermarket items. A non-approved red bulb is installed, and the required red rear reflector function is not present. These are improper, unsafe lights.



Improper lights: no sidemarker reflectors

The aftermarket rear lamps on this Honda Civic bear E-code marks, but do not contain the required sidemarker lights and reflectors. The original-equipment rear lamps had the sidemarker light and reflector functions built in. No separate red rear sidemarkers have been installed on this vehicle, so it is missing a required function.



Improper lights: white sidemarkers

The original amber front and red rear sidemarkers on these cars have been replaced by aftermarket white ones. Even if these white sidemarkers are equipped with coloured bulbs, white is not an acceptable colour for the front or rear sidemarker functions. The sidemarkers must emit and reflect amber (front) or red (rear) light, so these vehicles have improper, unsafe lights.

Some lights and reflectors are optional: they are allowed, but not required. All optional lights must be correctly coloured and installed and must function correctly. Check the vehicle's equipment against the Optional signal lights & reflectors table. Observe each lamp from several angles at a distance of about 2 m (6 ft) to make sure the brightest light shines straight forward or straight rearward, as applicable. Some aftermarket rear fog lamps, for example, shine their brightest light at an angle rather than straight rearward; this is not acceptable.

Are all optional lights and reflectors installed in accord with the Optional signal lights & reflectors function table?

Yes: The lights and signals are valid. Proceed to the next section of this document.

No: The vehicle fails.

Does the vehicle have any optional lights not listed in the table, or with colour or placement different than listed in the table?

Yes: The vehicle fails.

No: Proceed to the next test.

Check function of all lights and reflectors

Each light or reflector must function in a specific, prescribed way. Most steady-burning lights aren't allowed to flash, for example, and certain control operations must cause certain lights to illuminate. Reflectors must reflect brightly through a certain range of angles. Activate and check all of the vehicle's lights and reflectors against the Light & reflector function table.

Do all lights and reflectors function in accord with the Light & reflector function table?

Yes: The lights and signals are valid. Proceed to the next section of this document.

No: The vehicle fails.

Optional signal lights & reflectors

Function	Number & position	Colour	Notes
Front reflectors	Pair, one per side at front of vehicle, facing front	White	
Side turn signal repeaters	One on left and one on right side of vehicle, between front door and front bumper, shining wide-angle light to the side	Amber	May also burn steadily as front sidemarker light if located forward of front wheel.
Cornering lights	One on left and one on right side of vehicle, near front and/or rear, shining light to the side	White, yellow, or amber	
Rear fog lamp(s)	At rear of vehicle shining light rearward, one mounted between centre and left edge of vehicle or pair, one left and one right	Red	Brightest light must shine directly rearward. If two are installed, may dim down for tail light function

Light & reflector function

Function	Notes
Parking lights Tail lights Sidemarker lights Licence plate lights	Must illuminate steadily when the vehicle's parking lights are switched on. Must remain on with headlamps. On pre-1970 vehicles, front parking lights may switch off when headlamps come on. Many vehicles from other markets have parking lights built into headlamps. If headlamps must be replaced for Canadian traffic, new headlamps must have parking lights or separate parking lights must be fitted.
Sidemarker lights & reflectors, front and rear Rear reflectors	Must illuminate steadily, except that amber front sidemarker lights may flash with turn signals. Light produced and reflected must be visible 30° forward and 30° rearward of each light and reflector. Activate parking lights. Stand directly beside and 3 m (10 ft) away from each sidemarker. Hold a flashlight or droplight at eye level and aim it at the sidemarker. Walk with the inspection light 2 m (6 ft) forward of the sidemarker then 2 m (6 ft) rearward of the sidemarker. The light produced and reflected by each sidemarker must be clearly and continuously visible from the forward to the rearward inspection position; on rear reflectors, light must be clearly visible 45° inboard and outboard of each reflector.
Daytime running lights (DRL)	Must illuminate steadily when the engine is running, parking brake is released, headlamps are switched off, transmission is in a driving gear, and vehicle has travelled no more than 3 m (10 ft) forward. The DRLs must switch off or dim down to parking light intensity when the vehicle's headlamps are switched on. The DRL on one side may switch off or dim down when the turn signal on that same side is operating.
Turn signals - front, side, rear	All lights on each side must flash together at a steady rate of 1 to 2 flashes per second. On-time and off-time in each flash cycle must be approximately equal. Left and right must flash at the same rate. Amber front sidemarker lights may flash in phase or in opposite-phase with turn signals on same side. Left and right turn signals must self-cancel after a turn when steering wheel is returned to straight-ahead position.
Brake lights - left, right, centre	Must all illuminate steadily, together, immediately when brake pedal is pressed. Left and right lights may not flash unless they also serve as the rear turn signals and hazard flashers; if so, the left or right brake lamp may flash only when the applicable left or right turn signal is activated. Left and right brake lamps may flash together only when the hazard flashers are activated. The centre brake light may not flash or blink.
Hazard flashers	Must all flash together at a steady rate of 1 to 2 flashes per second. On-time and off-time in each flash cycle must be approximately equal. All front, side, and rear lights activated by the hazard flasher switch must flash at same rate. Amber front sidemarker lights may flash in phase or in opposite-phase with hazard flashers.
Reversing / back-up light(s)	Must illuminate steadily, immediately when engine is running and transmission is shifted into reverse gear. Must not illuminate in any gear other than reverse.
Rear fog light(s)	Must illuminate steadily. May be operable with parking lights, or with parking lights plus headlamps. Must be controlled by their own switch, or by their own activation mode of a combination lighting control switch. Must be able to switch off independently of any other lighting function.
Cornering lights	May illuminate steadily on both sides when transmission is in reverse gear, or steadily on one side when the turn signal on that side is operating. May remain lit for up to 10 seconds after turn signal is cancelled. Front cornering lights not in use must turn off or dim down to parking light intensity. Rear cornering lights not in use must turn off.

Validating forward illumination lamps

The forward illumination lamps on a vehicle are its required high and low beam headlamps, and any optional lamps such as auxiliary low beams, auxiliary high beam driving lamps, or fog lamps. The first task when inspecting a vehicle's lighting system is to check if all of the forward illumination devices (headlamps and any auxiliary lamps)

- are present and installed correctly,
- are of legally approved type for safe use in Canadian traffic,
- are in good condition, and
- function properly.

You'll be checking the low beams, the high beams and/or driving lamps, and any installed fog lamps. All of these lamps must be aimed correctly; aim inspection and adjustment is covered in its own section of this document.

Installed devices must function

All headlamps and auxiliary lamps installed on the vehicle, even optional ones, must function. Activate and observe all the vehicle's headlamps and auxiliary lamps.

Are there any lamps installed on the vehicle that do not function?

Yes: The vehicle fails.

No: Proceed to the next test.

Check low beams

Motorcycles must have one low beam headlamp; all other vehicles must have two. To see if the vehicle has low beam headlamps:

- Point the vehicle at a light-coloured wall 3-4 metres (10-15 ft) away.
- Turn on the headlamps and select the low beam setting.

Does one low beam (motorcycles) or one low beam on each side (all other vehicles) come on?

No: The vehicle fails.

Yes: The lamps pass this test. Proceed to the next test.

All lamps must be intact as manufactured. Disassembling a headlamp, modifying or replacing internal components, and reassembling it is not allowed unless the entire headlamp assembly is then tested and certified at an appropriate technical laboratory.

Examine each headlamp.

Is there evidence that the lens has been removed or the housing opened, internal components modified or replaced, and the lens reattached or housing closed back up?

Yes: The vehicle fails.

No: The lamps pass this test. Proceed to the next test.

Are the low beams an approved type?

Approved headlamps bear permanent markings indicating which regulations they are designed to meet. The markings are usually moulded or ink-stamped into or onto the outer or inner lens, but sometimes they are found on the top surface of the headlamp housing. They may be small, faint, and difficult to find or read, so look closely and carefully at the whole lamp to make sure you find all the markings. The headlamp will not need to be removed from the vehicle to find any relevant markings. Counterfeit markings are often found on after-market lamps, especially those styled differently than the original-equipment lamps; see the Reference section of this document for more information. If you suspect a lamp's markings are not legitimate, proof of the lamp's approval or certification—such as documentation from the manufacturer—may be required.

Headlamps for any market can be made anywhere in the world, so country of manufacture is not relevant. What matters is the regulations in the country where the vehicle is registered. All vehicles in Japan, for example, have headlamps conforming to Japanese regulations, no matter where the vehicle was built or by what company.

In Canada, low beam headlamps meeting the U.S. DOT regulations are allowed. Low beam headlamps meeting the European ECE regulations are also allowed if they produce a beam pattern for driving on the right side of the road. Low beams meeting Japanese regulations are not allowed.

In this test, you find and read the markings to see if they indicate a headlamp that may be approved and safe for Canadian traffic.

Do you find the letters DOT and SAE permanently marked on the headlamp?

Yes: The headlamps pass this test. Proceed to the next test.

No: **Do you find only a mark that reads SAE M with none of the other markings described in this test?**

Yes: The headlamps are legal for use only on motorcycles. If the lamps are installed on a motorcycle, they pass this test. If the lamps are installed on a vehicle other than a motorcycle, the vehicle fails.

No: Search for an E-code mark that looks like (E2) or [e2]-the actual number after the E or e doesn't matter. **Do you find an E-code mark?**

Yes: The headlamps pass this test.

No: The vehicle fails.

Illustrated example headlamp markings

Here are some illustrations of typical headlamp lens markings. The letters and number codes are described in full at the end of this section of the document.



Marks on U.S. headlamp

HB2 is the bulb type

SAE HR 95 means the headlamp takes halogen bulbs, and was built in accord with the SAE standards as of 1995.

DOT means the headlamp was built to conform to US Federal Motor Vehicle Safety Standard 108.

ECE marks on headlamp for right-hand traffic



Example of (E) marking

(E11) is the ECE type approval mark. It appears twice, once near each function marking.

[HCR] means this is a halogen high/low beam headlamp.



ECE marks on headlamp for left-hand traffic

[HCR] means this headlamp takes halogen bulbs and produces a low and a high beam.

(E2) is the ECE type approval mark.

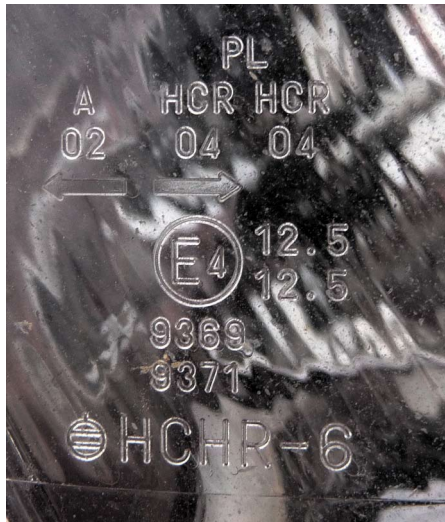
→ arrow near the **[HCR]** mark means this headlamp produces a low beam for left-hand traffic, not acceptable, safe, or legal in Canada.



ECE marks on headlamp for right-hand traffic

[HCR] means this headlamp takes halogen bulbs and produces a low and a high beam.

(E2) is the ECE type approval mark.



Complex ECE marks on combination front lamp

In this case, the one (E4) type approval mark applies to all the function markings present on the lens.

This lamp bears multiple markings for multiple version of the reflector, all of which use the same front lens.

The stylised divided-circle mark and "HCHR-6" are Japanese-market markings. Check these lamps carefully to make sure they are not for left-hand traffic.

Are the low beam lamps in acceptable condition?

All headlamps must be in good condition, appropriately mounted to the vehicle, and without any decorative cover or coating.



Improper lights: degraded lenses

The headlamp lenses on these vehicles have degraded with age and sunlight exposure. They are no longer transparent, but have clouded and yellowed. These lamps are unsafe, because the diffusing effect of the lens haze means less seeing light for the driver and more glare for other road users. Polishing sometimes restores degraded lenses, though frequently the lamps must be replaced to restore acceptable headlamp performance.

Is any headlamp lens cracked, broken, pitted, clouded, crazed, faded, fogged, or yellowed?

Yes: The vehicle fails.

No: Is any headlamp reflector dull, peeling, corroded, darkened, or stained?

Yes: The vehicle fails.

No: Are all headlamps properly and sturdily mounted to the vehicle with hardware, and with appropriate provisions for attaining and holding an aim setting?

Yes: Continue with this test.

No: Is there standing water or heavy condensation in any headlamp?

Yes: The vehicle fails.

No: Is there a cover, coating, or paint on or in front of the headlamp that darkens the colour or reduces the amount of light emitted?

Yes: The vehicle fails.

No: proceed to the next test.

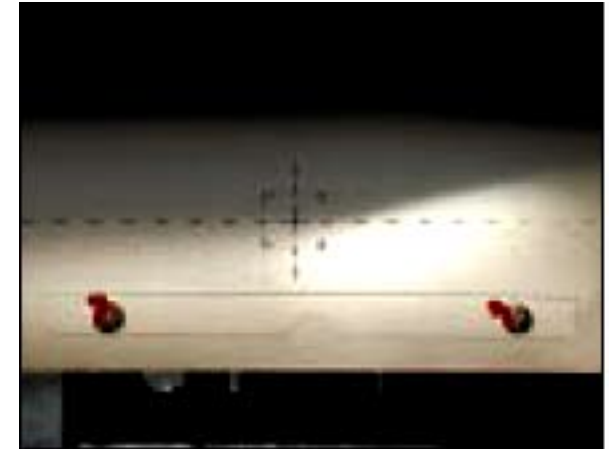
Do the low beams produce an acceptable beam pattern?

Canada has right-hand traffic. Vehicles flow along the right side of the road, so each low beam headlamp must produce an asymmetrical light distribution that sends most of its light in a downward-rightward direction relative to straight ahead. The low beams are intended to provide adequate seeing distance along the right side of the road without causing undue glare to oncoming drivers in traffic. In countries with left-hand traffic where vehicles flow along the left side of the road, such as Japan, low beams send most of their light downward-leftward. It is dangerous and illegal to use headlamps for left-hand traffic in Canada's right-hand traffic, which is why Japanese-specification and other left-traffic headlamps are not allowed in Canada.

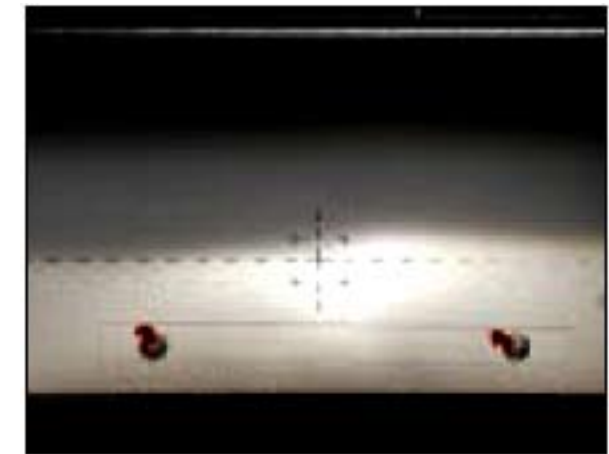
In this test, you examine the beam pattern produced by each low beam to check if it is for right-hand traffic or for left-hand traffic.

Point the vehicle at a light-coloured wall 3-4 m (10-15 ft) away in a darkened area. Turn on the low beams and examine the beam patterns they produce. It is often easier to examine one lamp at a time by covering or disconnecting the other lamp.

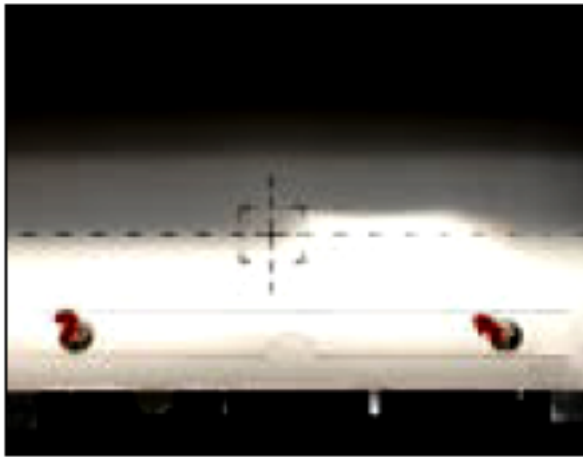
Compare the beam pattern on the wall to the following images.



1a: OK, one lamp shown



1b: OK, one lamp shown

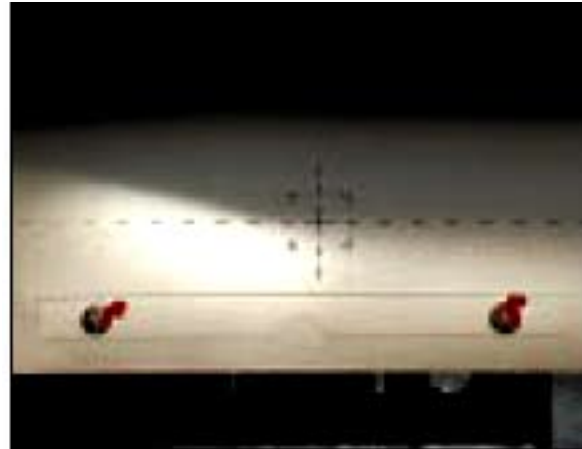


1c: OK, one lamp shown

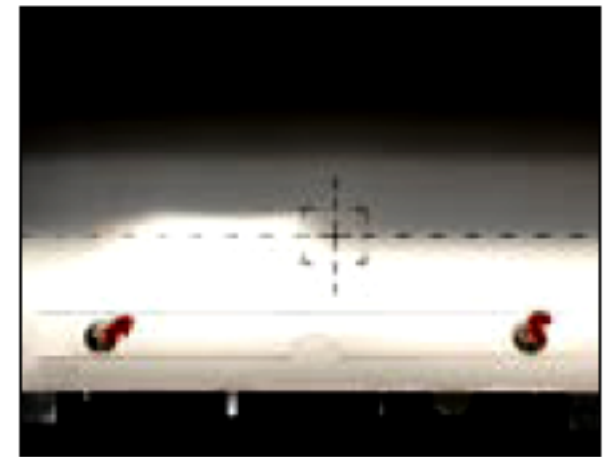
Do the low beams produce a beam pattern that looks like one of the beam images 1a through 1e?

Yes: The headlamps pass this test. Proceed to the next test.

No: Compare the beam patterns on the wall to beam images 2a through 2e, below:



2a: Not OK, one lamp shown



2c: Not OK, one lamp shown



1d: OK, both lamps shown



2d: Not OK, both lamps shown



1e: OK, both lamps shown



2b: Not OK, one lamp shown



2e: Not OK, both lamps shown

Do the low beams produce a beam pattern that looks like one of the beam images 2a through 2e?

Yes: The vehicle fails.

No: Contact your provincial authority for a determination.

Do the low beams produce light of an acceptable colour?

In Canada, headlamps must emit white light within the beam they produce. The light may be tinted slightly blue or slightly yellow and still meet the requirement for white light, just as an ordinary white incandescent household light bulb is somewhat yellow and an ordinary white fluorescent lamp is somewhat blue. Some headlamps producing acceptable white light within the beam will exhibit a noticeable fringe of colour at the top edge of the beam; this is OK, but a large band of blue or violet light above the beam is not permitted. Blue or other-colour light within the beam is not permitted except on official emergency vehicles. In this test, you examine the headlamps, the bulbs, and the light beam to determine if they produce an appropriate colour of light.

Point the car at a white wall and turn on the low beams, or hold a piece of white paper in front of each operating low beam.

Does the light beam striking the white wall or paper look white, with only slight blue or yellow tint, if any?

Yes: The headlamps pass this test. Proceed to the next test.

No: Remove and examine the low beam bulbs, looking for a DOT mark, or an E-code mark that looks like (E11) or [e11] (the number after the E or e is not important).

Are there any headlight bulbs without a DOT or E-code mark?

Yes: The vehicle fails.

No: Hold the bulb up to a white piece of paper or other well-lit white surface. **Is the bulb glass heavily coloured?**

Yes: The vehicle fails.

No: Proceed to the next test.



Improper lights: blue bulbs

This is a close-up view of an improperly-coloured (blue) bulb installed in a halogen headlamp. The blue bulb glass is clearly visible with the lamp turned off.

Are the headlamps equipped with the right kind of bulb?

All replaceable-bulb headlamps are designed to take either halogen or HID Xenon bulbs.

Halogen bulbs each contain one or two coiled wire filaments. They pass battery voltage through the filament, which heats up white-hot, producing light.

HID Xenon bulbs each contain a pair of aligned electrodes separated by a gap. They use an electronic ballast to generate high voltage which then jumps a gap between the electrodes, like a glass-enclosed spark plug. HID Xenon bulbs burn with a bright blue-white light, and they can only be safely used in headlamps designed specifically to accept them.

It is dangerous and illegal to install HID Xenon bulbs or “HID kits” in headlamps designed for halogen bulbs. In this test, you check to make sure the right kind of bulb is installed in the headlamp.

Examine all of the low beam bulbs.

Are they halogen bulbs that contain filaments?

Yes: Proceed to the next test (bulb wattage).

No: They are HID Xenon bulbs. Check them for a type marking D1R, D1S, D2R, D2S, D3R, D3S, D4R, D4S, or 9500. Check the headlamps themselves for a marking HG, DC, DCR, DC/R, DCCR, or DCHR.

Do all of the low beam bulbs and headlamps bear one of the listed markings?

Yes: The low beams are acceptable. Proceed to check the high beams.

No: The vehicle fails.

Are the halogen bulbs of the correct wattage?

There are many different types of halogen bulb, and each has only one correct wattage. All bulbs must be marked with their rated wattage. Illegal overwattage bulbs are widely available, so in this test you check to make sure bulbs of the correct wattage are installed.

Examine the headlight bulbs.

Are they marked with a single wattage rating such as “55w” on a bulb with one filament, or a double wattage rating such as “60/55w” on a bulb with two filaments?

Yes: Continue with this test.

No: The vehicle fails.

Is any bulb marked with a wattage rating higher than 65w on a vehicle with a 6- or 12-volt system, or 75w on a vehicle with a 24-volt system?

Yes: The vehicle fails.

No: The halogen bulbs are valid. Proceed to the next test.

Note - Parking Lights in Headlamps

Many vehicles from abroad have the parking light function built into the headlamps. If a vehicle’s unacceptable left-hand-traffic headlamps must be replaced with right-hand-traffic headlamps, the replacement headlamps must also produce the parking light function, or separate parking lamps must be installed.

Check high beams

Each motorcycle must have one high beam headlamp. Every other vehicle must have two or four high beam headlamps. The high beam function may be produced by the same headlamps that produce the low beam function, or by separate headlamps, or by external-mount high beam “driving” lamps near the same height as the headlamps. On some vehicles, the low beams remain lit with the high beams. On other vehicles, the low beams turn off when the high beams come on. To see if the vehicle has high beam headlamps:

I. Point the vehicle at a light-coloured wall 3-4 m (10-15 ft) away.

II. Turn on the headlamps and select the high beam setting.

Does one high beam on a motorcycle, or two or four high beams on each side of any other vehicle come on, and does the high beam indicator light up on the vehicle’s instrument cluster?

No: The vehicle fails.

Yes: The lamps pass this test. Proceed to the next test.

All lamps must be intact as manufactured. Disassembling a headlamp, modifying or replacing internal components, and reassembling it is not allowed unless the entire headlamp assembly is then tested and certified at an appropriate technical laboratory.

Examine each headlamp.

Is there evidence that the lens has been removed or the housing opened, internal components modified or replaced, and the lens reattached or housing closed back up?

Yes: The vehicle fails.

No: The lamps pass this test. Proceed to the next test.

Are the high beam headlamps in acceptable condition?

All headlamps must be in good condition, appropriately mounted to the vehicle, and without any decorative cover or coating.



Improper lights: degraded lenses

The headlamp lenses on these vehicles have degraded due to sunlight exposure. They are no longer transparent, but have clouded and yellowed. These lamps are unsafe, because the diffusing effect of the lens haze means less seeing light for the driver and more glare for other road users. Polishing sometimes restores degraded lenses, though frequently the lamps must be replaced to restore acceptable headlamp performance.

Is any headlamp lens cracked, broken, pitted, crazed, clouded, faded, fogged, or yellowed?

Yes: The vehicle fails.

No: Is any headlamp reflector dull, peeling, corroded, darkened, or stained?

Yes: The vehicle fails.

No: Are all headlamps properly and sturdily mounted to the vehicle with hardware, and with appropriate provisions for attaining and holding an aim setting?

Yes: Continue with this test.

No: Is there standing water or heavy condensation in any headlamp?

Yes: The vehicle fails.

No: Is there a cover, coating, or paint on or in front of the headlamp that darkens the colour or reduces the amount of light emitted?

Yes: The vehicle fails.

No: proceed to the next test.

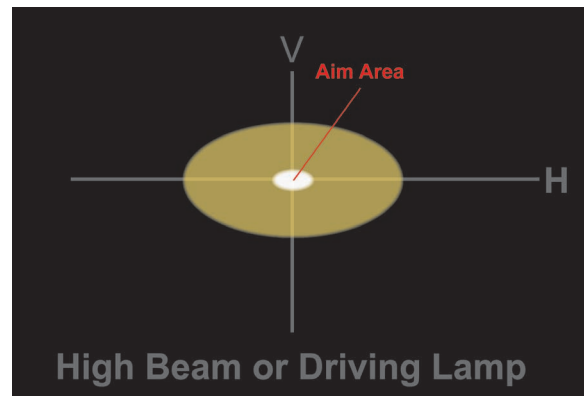
Do the high beams produce an acceptable beam pattern?

High beams are largely similar all over the world, so lens markings are not as critical as they are when examining low beams. U.S., European ECE, and Japanese high beams are all allowed. Each high beam lamp must produce a symmetrical beam throwing most of its light straight ahead, for long-distance illumination when driving on empty roads in the absence of oncoming or leading vehicles.

In this test, you examine the beam pattern produced by each high beam to make sure it is acceptable.

Point the vehicle at a light-coloured wall 3-4 m (10-15 ft) away in a darkened area. Turn on the high beams and examine the beam patterns they produce. It is often easiest to examine one lamp at a time by covering or disconnecting the other lamp.

Compare the beam pattern on the wall to this schematic beam diagram, keeping in mind that the beam may be wider or narrower, but must be symmetrical and centre-weighted:



Do all high beams on the vehicle produce a beam pattern that looks like the beam diagram?

Yes: The headlamps pass this test. Proceed to the next test.

No: The vehicle fails.

Do the high beams produce light of an acceptable colour?

In Canada, headlamps must emit white light within the beam they produce. The light may be tinted slightly blue or slightly yellow and still meet the requirement for white light, just as an ordinary white incandescent household light bulb is somewhat yellow and an ordinary white fluorescent lamp is somewhat blue. Blue or other-colour light within the beam is not permitted except on official emergency vehicles. In this test, you examine the headlamps, the bulbs, and the light beam to determine if they produce an appropriate colour of light.

Point the car at a white wall and turn on the high beams, or hold a piece of white paper in front of each operating high beam.

Does the light beam striking the white wall or paper look white, with only slight blue or yellow tint, if any?

Yes: The headlamps pass this test. Proceed to the next test.

No: Remove and examine the high beam bulbs, looking for a DOT mark, or an E-code mark that looks like (E11) or [e11] (the number after the E or e I not important).

Are there any headlight bulbs without a DOT or E-code mark?

Yes: The vehicle fails.

No: Hold the bulb up to a white piece of paper or other well-lit white surface. Is the bulb glass heavily coloured?

Yes: The vehicle fails.

No: Proceed to the next test.



Improper lights: blue bulbs

This is a close-up view of an improperly-coloured (blue) bulb installed in a halogen headlamp. The blue bulb glass is clearly visible with the lamp turned off.

Are the headlamps equipped with the right kind of bulb?

All replaceable-bulb headlamps are designed to take either halogen or HID Xenon bulbs.

Halogen bulbs each contain one or two coiled wire filaments. They pass battery voltage through the filament, which heats up white-hot, producing light.

HID Xenon bulbs each contain a pair of aligned electrodes separated by a gap. They use an electronic ballast to generate high voltage which then jumps a gap between the electrodes, like a glass-enclosed spark plug. HID Xenon bulbs burn with a bright blue-white light, and they can only be safely used in headlamps designed specifically to accept them.

It is dangerous and illegal to install HID Xenon bulbs or “HID kits” in headlamps designed for halogen bulbs. In this test, you check to make sure the right kind of bulb is installed in the headlamp.

Examine all of the high beam bulbs.

Are they halogen bulbs that contain filaments?

Yes: Proceed to the next test (bulb wattage).

No: They are HID Xenon bulbs. Check them for a type marking D1R, D1S, D2R, D2S, D3R, D3S, D4R, D4S, or 9500. Check the headlamps themselves for a marking HG, DR, DCR, DC/R, DCDR, or HCDR.

Do all of the high beam bulbs and headlamps bear one of the listed markings?

Yes: Proceed to the fog lamps section.

No: The vehicle fails.

Are the halogen bulbs of the correct wattage?

There are many different types of halogen bulb, and each has only one correct wattage. All bulbs must be marked with their rated wattage. Illegal overwattage bulbs are widely available, so in this test you check to make sure bulbs of the correct wattage are installed.

Examine the headlight bulbs.

Are they marked with a single wattage rating such as “55w” on a bulb with one filament, or a double wattage rating such as “60/55w” on a bulb with two filaments?

Yes: Continue with this test.

No: The vehicle fails.

Is any bulb marked with a wattage rating higher than 65w on a vehicle with a 6- or 12-volt system, or 75w on a vehicle with a 24-volt system?

Yes: The vehicle fails.

No: The halogen bulbs are valid. Proceed to the next test.

Note - Parking Lights in Headlamps

Many vehicles from abroad have the parking light function built into the headlamps. If a vehicle’s unacceptable left-hand-traffic headlamps must be replaced with right-hand-traffic headlamps, the replacement headlamps must also produce the parking light function, or separate parking lamps must be installed.

Check fog lamps

Fog lamps are optional auxiliary lamps producing a wide light beam with a sharp cutoff at the top, throwing most of their light downward and to the sides, intended to light the road and its edges close to the car for driver guidance at low speeds in rain, fog, snow, or dust. Fog lamps are not required, but any vehicle may be equipped with one or two of them. If they are installed they must function correctly, and they must be controlled by their own switch. The fog lamp switch may be separate or it may be built into the headlamp switch, but it must be possible to turn off the fog lamps while leaving the headlamps on.

Does the vehicle have fog lamps?

- I. Point the vehicle at a light-coloured wall 3-4 m (10-15 ft) away.
- II. Turn on the headlamps and select the low beam setting.
- III. Turn on the fog lamp switch, if the vehicle is so equipped.

Do the fog lamps come on?

No: The vehicle is not equipped with fog lamps. Proceed to the next section of this document.

Yes: The vehicle is equipped with fog lamps. Proceed to the next test.

Are the fog lamps correctly wired?

Check for a fog lamp indicator that lights up on the vehicle's instrument panel whenever the fog lamps are switched on.

Does a fog lamp indicator light on the vehicle's instrument panel illuminate when the fog lamps are on?

Yes: Continue with this test.

No: The vehicle fails.

Check that the fog lamps can only be made to light up when the vehicle's parking lamps or low beams are on, and not when the high beams are on.

Can the fog lamps be made to light up when the high beams are on?

Yes: The vehicle fails.

No: Can the fog lamps be made to light up when the low beams or just the parking lamps are on?

Yes: Continue with this test.

No: The vehicle fails.

Can the fog lamps be made to light up when the headlamps and parking lamps are switched off?

Yes: The vehicle fails.

No: Proceed to the next test.

Are the fog lamps in acceptable condition?

All fog lamps must be in good condition, appropriately mounted to the vehicle, and without any decorative cover or coating.

Is any fog lamp lens cracked, broken, pitted, clouded, crazed, or faded?

Yes: The vehicle fails.

No: Is any fog lamp reflector dull, peeling, corroded, darkened, or stained?

Yes: The vehicle fails.

No: Are all fog lamps properly and sturdily mounted to the vehicle with hardware, and with appropriate provisions for attaining and holding an aim setting?

Yes: Continue with this test.

No: Is there standing water or heavy condensation in any fog lamp?

Yes: The vehicle fails.

No: Is there a cover, coating, or paint on or in front of the fog lamp that darkens the colour or reduces the amount of light emitted?

Yes: The vehicle fails.

No: Proceed to the next test.

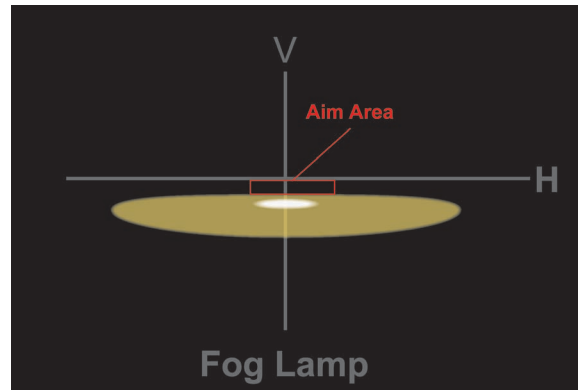
Do the fog lamps produce an acceptable light distribution?

Fog lamps are largely similar all over the world, so lens markings are not as critical as they are when examining low beams. U.S., European ECE, and Japanese fog lamps are all allowed. Each fog lamp must produce a symmetrical beam with a sharp cutoff line—bright below, dark above—at the top of the beam.

In this test, you examine the beam pattern produced by each fog lamp to make sure it is acceptable.

Point the vehicle at a light-coloured wall 3-4 m (10-15 ft) away in a darkened area. Turn on the fog lamps and examine the beam patterns they produce. It is often easiest to examine one lamp at a time by covering or disconnecting the other lamp.

Compare the beam pattern on the wall to this schematic beam diagram, keeping in mind that the beam may be wider or narrower, but must be symmetrical and have a flat cutoff at the top:



Do all fog lamps on the vehicle produce a beam pattern that looks like the beam diagram?

Yes: The fog lamps pass this test. Proceed to the next test.

No: The vehicle fails.

Do the fog lamps produce light of an acceptable colour?

Fog lamps may emit white or yellow light within the beam they produce. Blue or other-colour light within the beam is not permitted except on official emergency vehicles. In this test, you examine the fog lamps, the bulbs, and the light beam to determine if they produce an appropriate colour of light.

Point the car at a white wall and turn on the fog lamps, or hold a piece of white paper in front of each operating fog lamp.

Does the light beam striking the white wall or paper appear substantially yellow or colourless white?

Yes: The fog lamps pass this test. Proceed to the next test.

No: Remove and examine the fog light bulbs. Hold each bulb up to a white piece of paper or other well-lit white surface.

Is the bulb glass heavily coloured other than yellow?

Yes: The vehicle fails.

No: Proceed to the next test.

Are the fog lamps equipped with the right kind of bulb?

Replaceable-bulb fog lamps take halogen bulbs, in which battery voltage passes through a coiled-wire filament which heats up white-hot, producing light. HID Xenon bulbs use an electronic ballast to generate high voltage, which then jumps a gap between two electrodes, like a glass-enclosed spark plug. HID Xenon bulbs burn with a bright blue-white light, and they may only be safely and legally used in lamps designed to accept them. It is dangerous and illegal to install HID Xenon bulbs or “HID kits” in fog lamps. In this test, you check to make sure the right kind of bulb is installed in the fog lamp.

Examine the fog light bulbs.

Are they HID Xenon bulbs with electrodes and a gap?

Yes: The vehicle fails.

No: The fog lamps are equipped with halogen bulbs. Continue with this test.

There are many different types of halogen bulb, and each has only one correct wattage. All bulbs must be marked with their rated wattage. Illegal overwattage bulbs are widely available, so in this test you check to make sure bulbs of the correct wattage are installed.

Examine the headlight bulbs.

Are they marked with a single wattage rating such as “55w” on a bulb with one filament, or a double wattage rating such as “60/55w” on a bulb with two filaments?

Yes: Continue with this test.

No: The vehicle fails.

Is any bulb marked with a wattage rating higher than 65w on a vehicle with a 6- or 12-volt system, or 75w on a vehicle with a 24-volt system?

Yes: The vehicle fails.

No: The halogen bulbs are valid.

Lamp aim

Lamp aim is crucial to provide the driver with adequate, legal, and safe seeing in darkness and bad weather, without unsafe and illegal glare. The correct aim setting depends on the type of lamp and its mounting height.

All headlamps and auxiliary lamps must be checked and adjusted using a properly-calibrated optical aiming machine calibrated in degrees, percent, inches, centimetres and/or millimetres. The optical aiming device must be correctly set up and compensated for floor slope before checking or adjusting each and every headlamp, even different headlamps on the same vehicle.

Shining the beams on a marked wall is not an acceptably accurate method for setting lamp aim, though it can be used as a quick, rough check for gross misaim. The vehicle's lamps must be 7.6 m (25 ft) away from the wall so the cm, mm, or inch settings described for each type of beam will be applicable.

A **beam pattern** is the distribution of light produced by a lamp.

A **hot spot** or **high intensity zone** is the brightest area of light within the beam pattern.

A **cutoff** is a sharp, clear, horizontal line at the top of the beam pattern, with bright light below and darkness above.

A **cutoff kink** is the leftmost point at which the horizontal cutoff bends or angles upward.

The **optical centre** of a lamp is used as a mounting height reference when aiming the lamp. It is often indicated on the lens with a round dot or crosshair mark if it is not visually evident. Usually the optical centre is directly in front of the bulb.

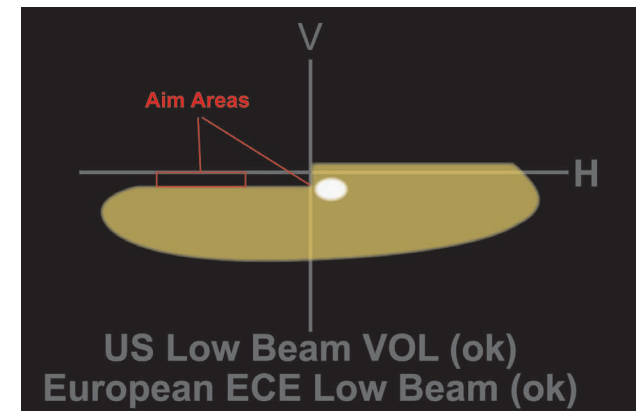
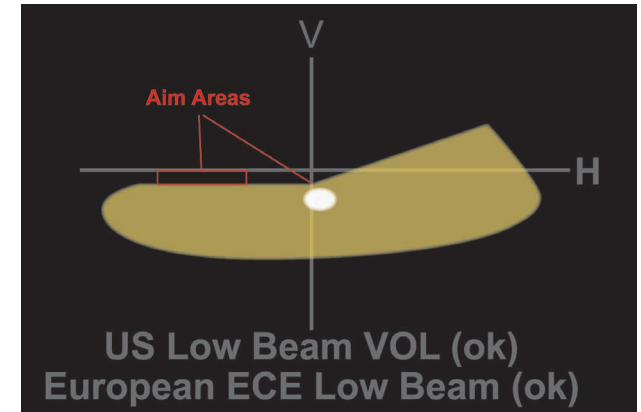
Aim check and adjustment by type of lamp

With the vehicle containing weight distributed to approximate a normal load of fuel, cargo, and driver, determine the lamp mounting height by measuring from the ground to the optical centre of the headlamp. In each beam diagram presented below, the H line represents the height of the lamp's optical centre and the V line is straight ahead of the lamp's optical centre. The intersection of the H and V lines is a forward projection of the position of the lamp's optical centre.

All combination high/low beam headlamps are aimed on the low beam setting. Once a combination high/low beam lamp has been aimed on low beam, make a quick check of its high beam pattern, which should be approximately centred as described below in the high beam aim section of this chapter. If the high beam hot spot is seen to be far to right of centre, don't attempt to adjust it; the headlamps are probably designed for left-hand traffic (e.g., Japan) and should be re-inspected according to the Forward lamp validation section of this document.

Low or high/low beam headlamps with E-code or DOT VOL marking

These lamps produce a low beam pattern with a cutoff at the top of the left side of the beam. There is a kink in the cutoff at the centre of the top of the beam. The kink is where the cutoff line bends or steps upward and to the right:



Vertical aim

These lamps are aimed vertically by setting the height of the cutoff relative to the centre height of the headlamp (H) as follows:

Mounting height: Up to 80 cm (34.5")

Aim setting: cutoff at 0.4 degree, 0.7 percent, 5 cm (2") below H.

Mounting height: 89 cm - 99 cm (35" to 39")
Aim setting: cutoff at 0.6 degree, 1 percent,
7.6 cm (3") below H.

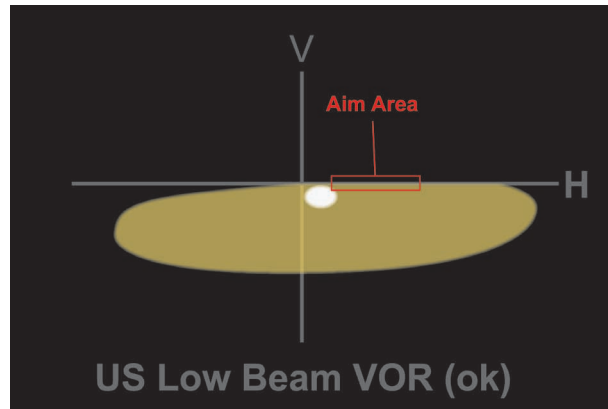
Mounting height: 100 cm (39.5") or higher:
Aim setting: cutoff at 0.8 degree, 1.4 percent,
10.2 cm (4") below H.

Horizontal aim

Set the cutoff kink so that it is directly on the vertical indicator line (V) on the aiming screen.

Low or high/low beam headlamps with DOT VOR marking

These lamps produce a low beam pattern with a cutoff at the top of the right side of the beam. There may or may not be a kink in the cutoff at the centre of the top of the beam.



high-intensity hot spot so that it just touches the vertical indicator line (V) on the aiming screen.

Vertical Aim

These lamps are aimed vertically by setting the height of the cutoff relative to the centre height of the headlamps (H) as follows:

Mounting height: up to 80 cm (34.5")

Aim setting: cutoff at 0 degree, 0 percent, or 0 cm
(cutoff on H).

Mounting height: 89cm - 99cm (35" to 39")

Aim setting: cutoff at 0.4 degree, 0.7 percent,
5 cm (2") below H.

Mounting height: 100 cm (39.5") or higher:

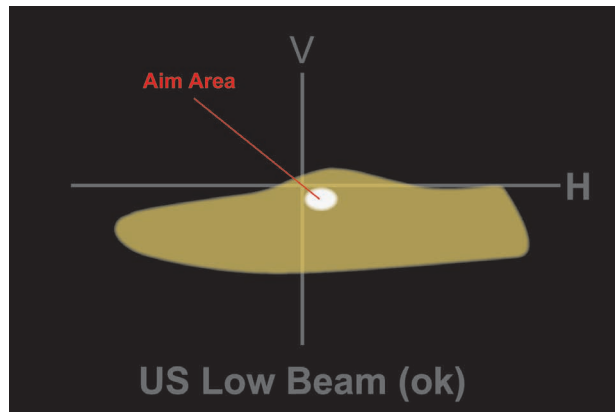
Aim setting: cutoff at 0.6 degree, 1 percent,
7.6 cm (3") below H.

Horizontal aim

Most VOR headlamps cannot be aimed horizontally. Those that can, are aimed horizontally by setting the cutoff kink or the left edge of the low beam's

Low or high/low beam headlamps with DOT marking (no VOR or VOL marking), and auxiliary low beams with SAE Z marking

These lamps can produce several different beam patterns, but there is always a hot spot in the low beam pattern.



Vertical aim

These lamps are aimed vertically by setting the top edge of the low beam's high-intensity hot spot relative to the centre height of the headlamp (H) as follows:

Mounting height: up to 80 cm (34.5")

Aim setting: 0 degree, 0 percent, or 0 cm (top edge of hot spot just touching H).

Mounting height: 89 cm - 99 cm (35" to 39")

Aim setting: top edge of hot spot 0.4 degree, 0.7 percent, 5 cm (2") below H.

Mounting height: 100 cm (39.5") or higher:

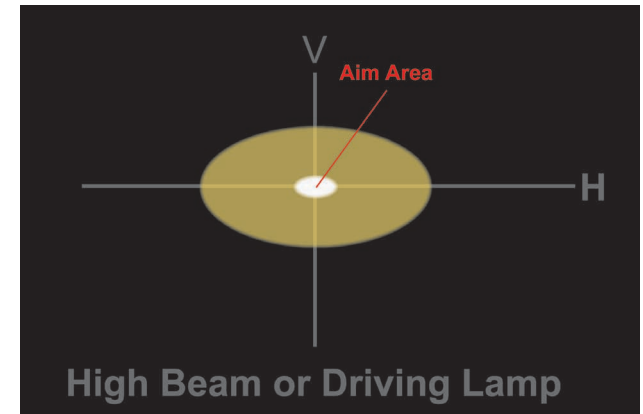
Aim setting: top edge of hot spot 0.6 degree, 1 percent, 7.6 cm (3") below H.

Horizontal aim

These headlamps are aimed horizontally by setting the left edge of the low beam's high-intensity hot spot so that it just touches the vertical indicator line (V) on the aiming screen.

High beam headlamps aimable independently of low beams, and all auxiliary driving lamps

These lamps produce a symmetrical beam that must be aimed straight ahead of the lamp.



Vertical aim

These lamps are aimed vertically by setting the centre of the lamp's high-intensity hot spot as follows:

Any mounting height:

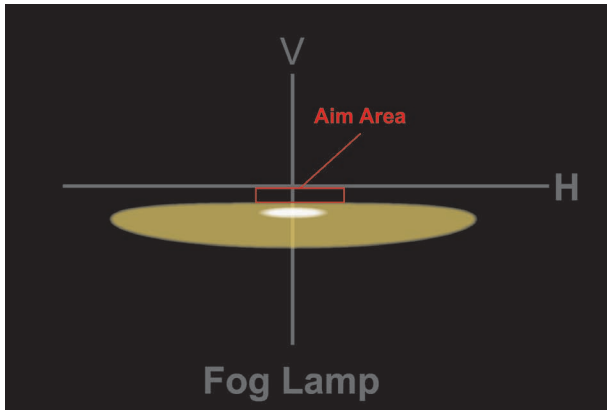
Aim setting: 0 degree, 0 percent, or 0 cm (hot spot centred vertically at headlamp centre height H).

Horizontal aim

High beams are aimed horizontally, if they are equipped for this adjustment, by centring the high-intensity "hot spot" so that it spills equally to the left and right of the vertical indicator line (V) on the aiming screen.

Fog lamps

These lamps produce a wide bar-shaped beam pattern with a cutoff at the top of the beam.



Vertical aim

Fog lamps are aimed vertically by setting the height of the cutoff relative to the fog lamp's centre height (H) as follows:

Mounting height: Up to 46 cm (18")

Aim setting: cutoff at 0.4 degree, 0.7 percent, 5cm (2") below H.

Mounting height: 47 cm - 71 cm (18.5" to 28")

Aim setting: cutoff at 0.6 degree, 1 percent, 7.6 cm (3") below H.

Mounting height: 72 cm (28.5") or higher

Aim setting: cutoff at 0.8 degree, 1.4 percent, 10.2 cm (4") below H.

Horizontal aim

Fog lamps are aimed horizontally, if they are equipped for this adjustment, by centring the beam so that it spills equally to the left and right of the vertical indicator line (V) on the aiming screen.

Reference

Lamp, light & reflector function markings

The information in this section allows you to interpret the markings on a lighting device to help resolve questions about its functions and approvals. Some markings with different meanings are quite similar to each other, so check them carefully. If a lighting device bears markings that contradict each other, it does not mean the device produces all the marked functions. On original-equipment devices, it usually means the component bearing the markings (usually the lens or bezel) is used on multiple different versions of the lighting device, as in headlamps for different markets around the world. On aftermarket devices, particularly those styled differently from original equipment, conflicting markings are often counterfeit and the device does not in fact comply with regulations.

ECE (European E-code) markings

ECE-approved lighting components bear markings indicating the functions performed. These functional marks may be placed individually on the relevant portions of a multifunction lamp, or all the marks may be grouped together on one part of the lamp.

Arrows

An arrow above or below any function mark, except one denoting a low-beam headlamp function, indicates the side of the vehicle for which the applicable function is intended, for front and rear functions. Such arrows point outboard. For side functions such as turn signal repeaters and sidemarker lights, any arrow must point towards the front of the vehicle. If there is no arrow, the function or component is approved for use on either side of a vehicle.

On headlamps producing a low beam, an arrow pointing to the right (as observed when facing the lens) near the low beam function mark indicates the lamp produces a left-hand-traffic low beam not safe or approved for use on Canadian roads, and cannot be adjusted for safe or legal use. A double-headed arrow near the low beam function marking indicates the lamp can be set to produce a right- or a left-hand-traffic low beam. These headlamps are safe, legal, and approved for use in Canada when set and adjusted to produce a low beam for right-hand traffic. If there is no arrow at all near the low beam function marking, it means the headlamp produces a right-hand-traffic low beam safe and legal for use in Canada.

ECE light, signal, & reflector function markings

- A** Front parking lamp
- AR** Reversing (backup) Lamp
- F** or **B** Rear Fog Lamp
- IA** or **IB** Reflex reflector
- R** Tail Lamp

S1 Brake lamp

S3 Centre High Mount Stop Lamp (3rd brake light)

1, **1a**, or **1b** Front Turn Signal

2a Rear Turn Signal

5 Side Turn Signal Repeater

SM1 or **SM2** Sidemarker lamp

RL Daytime Running Lamp (DRL)

← Front function or device for right side of vehicle, rear function or device for left side of vehicle (arrow points outward), or side function or device for left side of vehicle (arrow points forward)

→ Front function or device for left side of vehicle, rear function or device for right side of vehicle (arrow points outward), or side function or device for right side of vehicle (arrow points forward)

ECE forward illumination function markings

B or **F3** Front Fog lamp

C Low beam headlamp with tungsten bulb

R High beam headlamp or driving lamp with tungsten bulb

CR or **C/R** Low/high beam headlamp with tungsten bulb

HC Low beam headlamp with halogen bulb

HR High beam headlamp or driving lamp with halogen bulb

HCR or **HC/R** Low/high beam headlamp with halogen bulb

DC Low beam headlamp with HID Xenon bulb

DR High beam headlamp or driving lamp with HID Xenon bulb

DCR or **DC/R** Low/high beam headlamp with HID Xenon bulb

PL Plastic lens (may occur with any of other forward illumination markings)

→ Low beam light pattern is for use in traffic flowing on left side of road

↔ Low beam light pattern can be adjusted for use in traffic flowing on either side of road

SAE markings

Many - but not all - lighting devices originally built for use in North America bear marks indicating the functions built into each device. These functional marks may be placed individually on the relevant portions of a multifunction lamp, or all the marks may be grouped together on one part of the lamp. In either case, they are placed after the letters "SAE".

SAE light, signal, & reflector function markings

- A or A2 Reflex reflector
- E2 Side turn signal repeater
- I, I2, I3, I4, I5, I6 or I7 Turn signal
- P Front parking lamp
- P2 Sidemarker lamp
- R Reversing (backup) lamp
- S Brake lamp
- T Tail lamp
- U3 Centre high-mounted brake lamp (CHMSL)
- Y2 or DRL Daytime Running Lamp

SAE forward illumination function markings

- F Front fog lamp
- F2 Rear fog lamp
- H Sealed beam headlamp
- HG Xenon HID headlamp
- HR Halogen replaceable-bulb headlamp
- M Motorcycle headlamp
- N Moped headlamp
- Y Driving lamp
- Z Auxiliary low beam lamp

Detecting counterfeit lamps

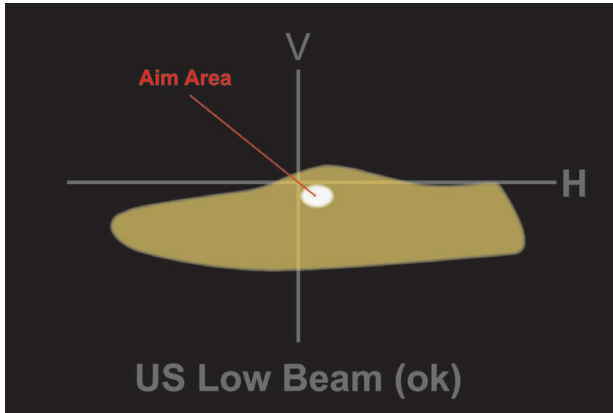


The combination front lamp assemblies on this Honda Civic are aftermarket items. They are marked SAE and DOT, and they bear all the same function markings as the original-equipment lamps. However, despite bearing the function markings for a sidemarker light and a sidemarker reflector, these lamps are not so equipped; the markings are counterfeit. Counterfeit approval and function markings are often found on aftermarket lamps, lights, and reflectors that differ from original equipment in style or design. Therefore, function and approval markings are not dependable by themselves to determine whether a lamp is safe or legal. Always check lamps for fully proper function and vehicles for full equipment, especially when the vehicle is equipped with styled aftermarket lights, lamps, or reflectors.

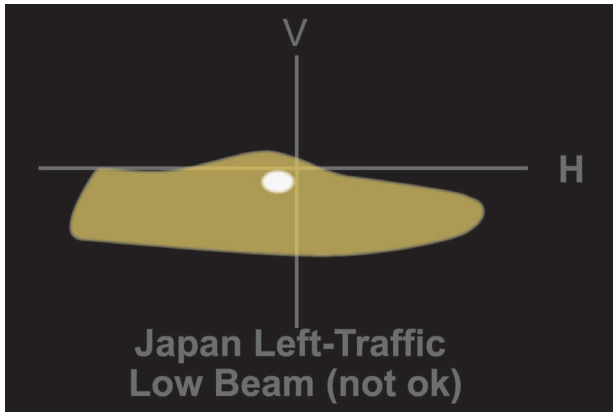
Also, the blue bulbs shown do not produce the required amber color for the turn signal and sidemarker functions, and do not produce the required amber or white color for the front parking lamp function. Only emergency vehicles are allowed to display blue light. This vehicle has improper, unsafe lights.

Annotated beam pattern images

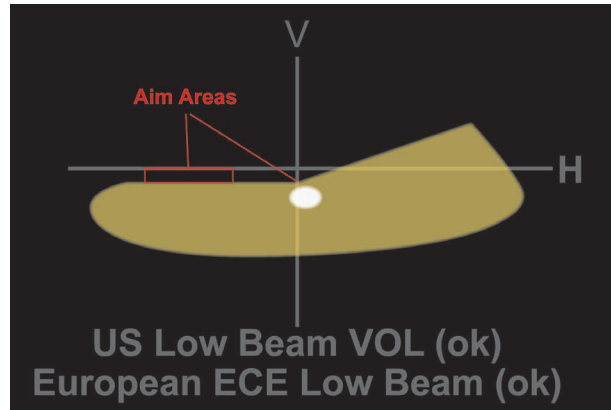
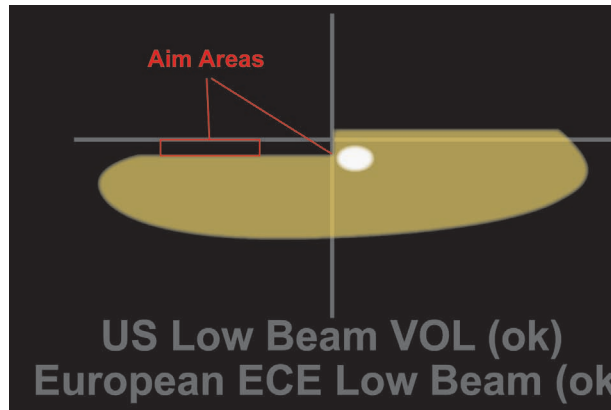
Here are diagrams of each type of beam pattern you are likely to encounter when checking a vehicle's headlamps and auxiliary lamps.



A typical U.S. low beam pattern without visual/optical aim cutoff. The aim is checked and adjusted by looking at the position of the high-intensity hot spot, which is shifted downward and rightward relative to straight ahead. Acceptable if properly aimed.

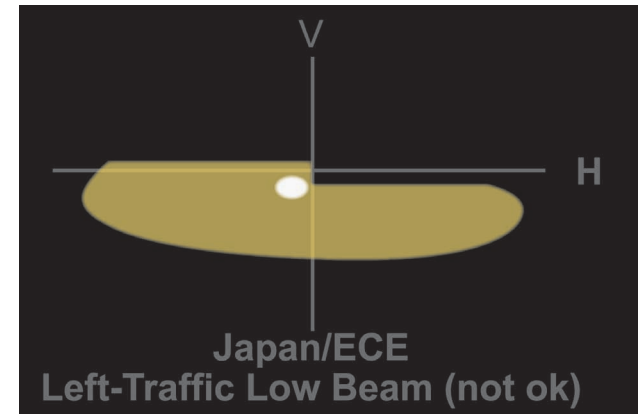
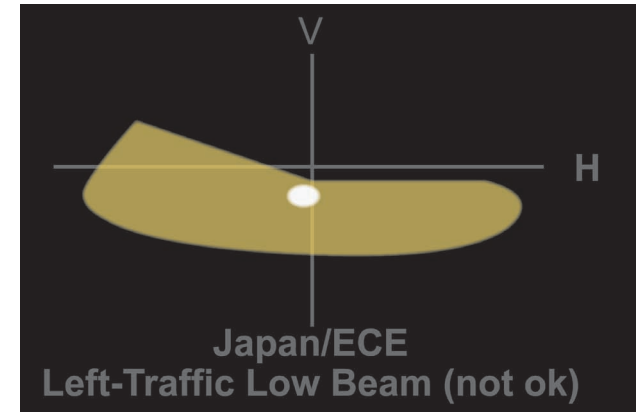


This is a Japanese, British, or Australian low beam pattern for left-hand traffic, without visual/optical aim cutoff. It is the mirror image of the U.S. low beam; its hot spot is shifted downward and leftward relative to straight ahead. This beam is for left-hand traffic. It is not safe or legal for use in Canada, and cannot be adjusted to be safe or legal. Fail vehicles with these headlamps.

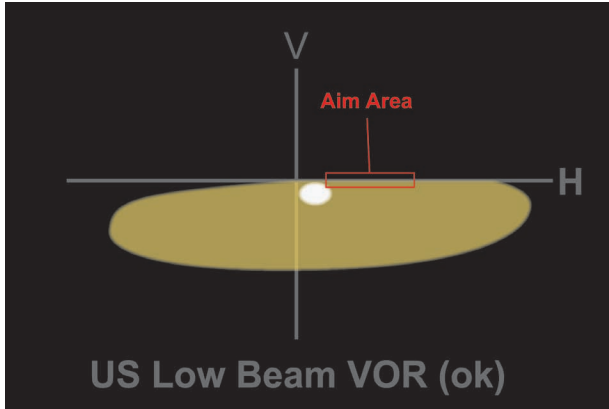


These images show two variants of an ECE or US VOL low beam pattern for right-hand traffic, with a visual/optical aim cutoff located at the top of the left side of each beam. The vertical aim is checked and adjusted by looking at the height of the cutoff. The horizontal aim is checked and adjusted by look-

ing at the cutoff elbow/kink. Note how the beam sweeps or steps upward and rightward. Acceptable if properly aimed.

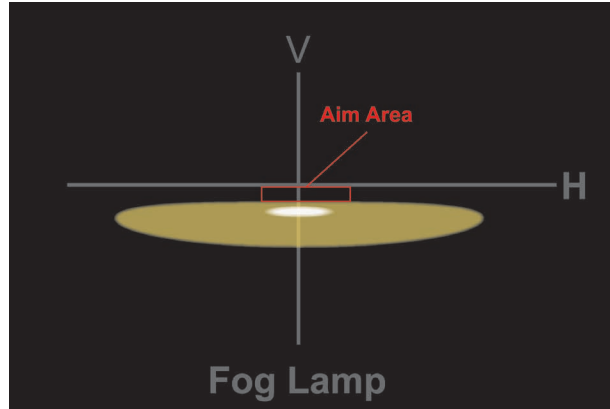


These images show a Japanese, British, Australian, or ECE low beam pattern for left-hand traffic, with a visual/optical cutoff. It is the mirror image of the ECE/ U.S. VOL pattern; it sweeps or steps upward-leftward. This beam is not safe or legal for use in Canada. Unless the headlamp is marked with a ↔ double-headed arrow, it cannot be adjusted for safe and legal use in Canada. Fail vehicles with these headlamps if they cannot be set to produce a beam for right-hand traffic.



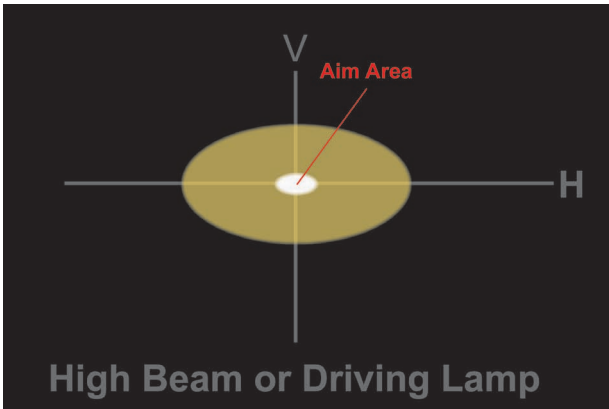
U.S. low beam, VOR cutoff

This is a U.S. low beam pattern for right-hand traffic, with a visual/optical aim cutoff located at the top of the right side of each beam. The vertical aim is checked and adjusted by looking at the height of the cutoff. There is usually no horizontal aim adjustment. There may or may not be a stairstep or kink in the beam pattern. Acceptable if properly aimed.



Fog lamp

This is a fog lamp. They are more or less the same all over the world, so there is no concern over right- or left-hand traffic. There is a flat visual/optical aim cutoff all the way across the top of the beam pattern. The vertical aim is checked and adjusted by looking at the height of the cutoff. The horizontal aim, if it is adjustable, is set by placing the beam so the central hot spot is centred straight ahead of the lamp.



High beam

This is a high beam or driving lamp. They are more or less the same all over the world, so there is no concern over right- or left-hand traffic. Aim is checked and adjusted by looking at the placement of the high-intensity hot spot, which should be set to point straight ahead of the lamp.