

Vehicle Flashing Light Regulations in the U.S.A. By Soft Lights Foundation



Federal Law Prohibits Emergency Flashing Lights on Vehicles

The National Highway Traffic Safety Administration (“NHTSA”) codifies its concerns about the safety impacts of auxiliary flashing lights in the following regulation in the Federal Motor Vehicle Safety Standards (“FMVSS”) Section 108.

49 C.F.R. § 571.108(S6.2.1): No additional lamp, reflective device, or other motor vehicle equipment is permitted to be installed that impairs the effectiveness of lighting equipment required by this standard.

To clarify NHTSA’s intent in publishing 49 C.F.R. § 571.108(S6.2.1), NHTSA published a Letter of Interpretation on December 13, 2024, which confirms that the installation of any type of auxiliary emergency warning lamp that impairs the effectiveness of original lighting equipment is illegal by stating:

*Therefore, because the “emergency warning lights” are not steady burning, they would not comply with FMVSS No. 108 and would impair required lighting.*¹

¹ <https://www.nhtsa.gov/interpretations/ncc-241023-001tsei-tima-letter-interpretation-571108-flashing-amber-lights-12-13>

49 U.S. Code § 30122 prohibits companies from installing lighting that makes the original lighting equipment inoperative.

49 U.S. Code § 30122(b): A manufacturer, distributor, dealer, rental company, or motor vehicle repair business may not knowingly make inoperative any part of a device or element of design installed on or in a motor vehicle or motor vehicle equipment in compliance with an applicable motor vehicle safety standard prescribed under this chapter unless the manufacturer, distributor, dealer, rental company, or repair business reasonably believes the vehicle or equipment will not be used (except for testing or a similar purpose during maintenance or repair) when the device or element is inoperative.

In the same December 13, 2024, Letter of Interpretation, NHTSA clarified that the “make inoperative” provision of 49 U.S. Code § 30122(b) prohibits manufacturers, distributors, dealers, rental companies, and repair businesses from installing auxiliary vehicle flashing lights by stating:

After carefully considering your letter, we reaffirm our previous interpretations that, under current law, “emergency warning lights” may not be installed as original equipment and that persons subject to the make inoperative provision of the Safety Act may not legally install the lamps as original or aftermarket equipment.

Therefore, the installation of auxiliary vehicle flashing lights is illegal.

Light Emitting Diode Flashing Lights

The switch to Light Emitting Diode (“LED”) flashing lights has exacerbated the hazards and dangers of using auxiliary flashing lights on vehicles. LEDs emit an excessively intense light, and the digital nature of the flashing makes LEDs more hazardous than many other types of flashing lights.

The Food and Drug Administration (“FDA”) is mandated by 21 U.S.C. 360ii to establish and maintain a liaison with NHTSA to test and evaluate LED flashing lights but has failed to do so. As a result, the FDA has not published performance standards for LED flashing lights to ensure the health, safety, and civil rights of the public.

The metric for the intensity of light that shines directly into a person’s eye is called “luminance”. Government agencies have failed to set any limits on luminance to ensure eye safety.

“NHTSA interprets the impairment provision to prohibit auxiliary lamps that are so bright as to obscure or distract from a vehicle’s required lamps.”²

LED flashing lights are so bright that they undoubtedly obscure or distract from the vehicle’s required lamps, as shown in the example images below.

² <https://www.nhtsa.gov/interpretations/571108-ama-schaye-front-color-changing-light>





Safety Research

In the December 13, 2024, Letter of Interpretation, NHTSA wrote:

"NHTSA has long believed that flashing amber lighting can unduly divert driver attention and cause confusion among drivers, even among those who have seen them before."

The study titled "Effects of Emergency Vehicle Lighting Characteristics on Driver Perception and Behavior" showed that high intensity lights impair vision.

"The results indicate that higher intensity lights were judged consistently as more glaring..."³

Thus, high intensity flashing lights such as those that use LED technology will impair the effectiveness of federally required lighting equipment. High intensity flashing lights create a safety hazard.

An April 17, 2024, research paper titled "High visual salience of alert signals can lead to a counterintuitive increase of reaction times", demonstrates exactly what occurs when a public entity uses auxiliary LED flashing lights.

"However, increasing visual salience did not yield similar benefits: instead, it increased the time between fixating the alert and responding, as high-salience alerts interfered with alert-task execution."⁴

Flashing lights are dangerous and increase the risk of injury or death because the flashing lights "interfere with alert-task execution". In other words, exactly when the driver needs to be alert and

³ <https://www.respondersafety.com/Download.aspx?DownloadId=f31a5f73-7b95-44c7-bd25-1e4cdfce5229>

⁴ <https://www.nature.com/articles/s41598-024-58953-4>

avoid the vehicle with the flashing lights, the use of the flashing lights interferes with vision and cognitive functioning, leading to an increased risk of crash.

Health Impacts

The research article titled “Accidental macular injury from short-term exposure to a handheld high-intensity LED light” details an eye injury from exposure to a flashing Light Emitting Diode (“LED”).⁵

The research article titled, “Visually sensitive seizures: An updated review by the Epilepsy Foundation” describes how flashing lights can trigger seizures for individuals with epilepsy.

“Images with flashes brighter than 20 candelas/m² at 3-60 (particularly 15-20) Hz occupying at least 10 to 25% of the visual field are a risk, as are red color flashes or oscillating stripes.”⁶

An in-depth March 2, 2025, research article titled International Guidelines for Photosensitive Epilepsy: Gap Analysis and Recommendations confirms that any change in luminance of greater than 20 cd/m² creates a risk of seizure, and that the color red is particularly hazardous.⁷ Auxiliary LED flashing lights are hundreds or thousands of times more intense than 20 cd/m² which is why individuals with epilepsy, migraines, photophobia, and autism have reported epileptic and non-epileptic seizures from exposure to LED flashing lights.

The intensity of a directly-viewed light source is measured by the metric “luminance” in candela per square meter or nit. The human eye has a bi-convex lens that recreates the luminance on the retina, which in turn sends intensity signals to the brain. The following are typical luminance levels for reference:

Comfort level: 1-100 cd/m²

Epilepsy seizure risk threshold for flashing lights: 20 cd/m²

Typical discomfort level: 1,500-2,400 cd/m²

Photophobia discomfort level: 100-1,000 cd/m²

Maximum tolerance level: 10,000-50,000 cd/m²

Auxiliary LED vehicle flashing lights: 1,500-100,000 cd/m²

LED flashing lights on vehicles are likely to trigger seizures due to their high luminance.

Movies that use flashing lights sometimes post warnings, such as the one below from Incredibles 2.⁸ Thus, it is well known that flashing lights can trigger seizures in individuals who are photosensitive, and yet cities are using auxiliary LED flashing lights on city vehicles, even though these lights are illegal and known to be a significant health risk.

⁵ <https://pmc.ncbi.nlm.nih.gov/articles/PMC10404656/>

⁶ <https://onlinelibrary.wiley.com/doi/10.1111/epi.17175>

⁷ <https://pmc.ncbi.nlm.nih.gov/articles/PMC11872230/>

⁸ <https://www.wbaltv.com/article/theaters-post-warnings-after-disney-says-incredibles-2-scene-could-cause-seizures/21600147>

**WARNING: This video
contains flashing lights**

Many reports of neurological and psychological trauma have been reported to the FDA from exposure to LED flashing lights. (Appendix A).

Conclusion

Due to lack of enforcement, auxiliary flashing lights on vehicles are everywhere. However, unless and until the federal government modifies federal regulations, auxiliary flashing lights on vehicles are prohibited. Given the knowledge that auxiliary flashing lights create a health and safety hazard and given that they are illegal under federal law, all government agencies and businesses should direct staff to immediately refrain from using auxiliary vehicle flashing lights.

August 3, 2025

Appendix A – NHTSA Letters of Interpretation

49 C.F.R. § 571.108(S6.2.1): No additional lamp, reflective device, or other motor vehicle equipment is permitted to be installed that impairs the effectiveness of lighting equipment required by this standard.

December 13, 2024 - *"NHTSA has long believed that flashing amber lighting can unduly divert driver attention and cause confusion among drivers, even among those who have seen them before."*⁹ – Amber auxiliary flashing lights are illegal.

December 13, 2024 - *"Flashing amber lighting, except for turn signal lamps, is not "an established lighting scheme." within the context of FMVSS No. 108."*¹⁰ – Amber auxiliary amber flashing lights are illegal.

December 13, 2024 - *"The use of flashing amber lights is not sufficiently established and standardized to avoid unduly diverting driver attention or causing confusion. Thus, we continue to believe these lights impair required lighting equipment."*¹¹ - Amber auxiliary amber flashing lights are illegal.

December 13, 2024 – *"Therefore, because the "emergency warning lights" are not steady burning, they would not comply with FMVSS No. 108 and would impair required lighting."*¹² [Nothing in this letter is intended to conflict with our interpretation, stated in our May 2, 2003, Letter to Lt. Col. Steve Flaherty, that deference to states applies to "the installation and use of emergency lighting devices on [the state's] vehicles."] – Emergency warning lights that flash on vehicles such as on tow trucks, utility vehicles, and private ambulances are illegal. However, this letter muddles this situation with municipally-owned and state-owned emergency vehicles such as police, fire, and ambulance and conflicts with NHTSA's September 9, 2019 interpretation that all auxiliary flashing lights are illegal.

September 9, 2019 - *"Moreover, NHTSA continues to believe that flashing auxiliary lamps would impair the effectiveness of required lamps by distracting or confusing other road users."*¹³ – All auxiliary flashing lamps are illegal.

September 9, 2019 – *"NHTSA interprets the impairment provision to prohibit auxiliary lamps that are so bright as to obscure or distract from a vehicle's required lamps."*¹⁴ – The extreme luminance of LED flashing lights and the reports of vision impairment by the public demonstrate that all LED auxiliary flashing lights are illegal.

⁹ <https://www.nhtsa.gov/interpretations/ncc-241023-001tsei-tima-letter-interpretation-571108-flashing-amber-lights-12-13>

¹⁰ <https://www.nhtsa.gov/interpretations/ncc-241023-001tsei-tima-letter-interpretation-571108-flashing-amber-lights-12-13>

¹¹ <https://www.nhtsa.gov/interpretations/ncc-241023-001tsei-tima-letter-interpretation-571108-flashing-amber-lights-12-13>

¹² <https://www.nhtsa.gov/interpretations/ncc-241023-001tsei-tima-letter-interpretation-571108-flashing-amber-lights-12-13>

¹³ <https://www.nhtsa.gov/interpretations/571108-ama-schaye-front-color-changing-light>

¹⁴ <https://www.nhtsa.gov/interpretations/571108-ama-schaye-front-color-changing-light>

May 2, 2003 – *“We see no reason to question the judgment of the State in allowing strobe lights on fire vehicles, if such legislation is enacted in Virginia.”*¹⁵ – This opinion is superseded in 2019 and 2024, when NHTSA states that all auxiliary flashing lights impair the effectiveness of required lamps. The 2001 and 2003 letters are an anomaly when compared with all other NHTSA letters, where NHTSA states repeatedly that NHTSA’s core belief is that auxiliary flashing lights pose a risk to safety.

July 3, 2001 - *"We want to allow States to install and use strobe lights on unmarked vehicles yet we do not think it in the interest of safety to allow the general public to do the same on virtually identical vehicles."*¹⁶ – This statement is contradictory to nearly all of NHTSA’s other Letters of Interpretation.

July 3, 2001 - *"Under Federal law (49 U.S.C. 30122), the State, as the owner of a vehicle, may itself modify the vehicle after its purchase even if this modification results in a noncompliance with a Federal motor vehicle safety standard."*¹⁷ – NHTSA thus interprets the “owner” of a vehicle to include the State. However, a State employee would need to perform the actual work. The State may not hire a contractor, vendor, or dealer to install illegal lighting equipment.

May 1, 1986 - *"However, Standard No. 108 does prohibit installation of any aftermarket lighting device before initial sale of a new vehicle if that device "impairs the effectiveness" of lighting equipment that the standard requires, and you should be aware of this prohibition if you intend to sell the device to new car dealers for installation on new cars in stock."*¹⁸ – Installing auxiliary flashing lights at any point after the manufacture of the original equipment is illegal.

¹⁵ <https://www.nhtsa.gov/interpretations/flaherty>

¹⁶ <https://www.nhtsa.gov/interpretations/vastatepatztv>

¹⁷ <https://www.nhtsa.gov/interpretations/vastatepatztv>

¹⁸ <https://www.nhtsa.gov/interpretations/86-250>

Appendix B – LED Incident Reports

The following incident reports involving vehicle flashing lights have been submitted to the U.S. Food and Drug Administration via the Soft Lights Foundation.

July 6, 2025 – Oviedo, FL – Epilepsy

I have to constantly close my eyes where there might be flashing lights or cause me to avoid certain places which puts me in a down mood because I feel like I can't even leave my house due to fear of having a seizure. It can be depressing since your social life is limited. I remember in the past being in a club and I had a seizure because they turn on their strobe lights. I wish they would just be banned completely since they are not good for the eyes and cause so much harm.

April 16, 2025 – Cincinnati, OH – Other

Today's automobiles, specifically SUVs made by Toyota, Hyundai, Kia, Honda and Acura have headlights that are WAY TOO BRIGHT!! When these vehicles come at you on a dark road, their light spread is literally blinding and especially on a rainy night, this has almost caused me to have a crash several times and always I'll see spots for several minutes after encountering one of these cars. I've noticed vision problems as well as increased frequency of headaches as of late and I have changed nothing in my lifestyle other than having greater exposure to these lights. And we shouldn't forget that the light bars on police vehicles and tow trucks are also retina-searing bright. We can see a flashing incandescent beacon on one of these cars from plenty of distance at night. This needs to be a class action suit against the auto manufacturers or the lamp manufacturers.

March 31, 2025 – Cedar Lake, IN – Migraine

I am only 20 years old but I struggle so much with driving at night or on a cloudy day. Basically every single car (since they all have LEDs) blinds me as they drive past. Just looking at the side of the road doesn't work for me. It is impossible for me to see the road or anything else when there is a car with LEDs. It comes at me from cars driving towards me, through the rear view mirror, and the side windows. Also, the flashing LED lights for ambulances/police cars at intersections make me feel nauseous and like I am going to get a migraine. I have suffered from migraines for many years, so I am light sensitive. However, the LED lights are the worst thing for me during the day and night time.

February 17, 2025 – Yolo County, CA – Autism

I was driving east on Hwy 16 towards Woodland, when I noticed intense amber LED flashing lights close to a mile ahead. I started to slow down. As I reached the LED flashing lights, the intensity and digital pulsing was unbearable. There were multiple vehicles. The panic started to set in. I covered my eyes with my hands and slowed to less than 20mph, basically trapped by the LED lights.

I crept forward in my car, blocking nearly everything from my sight except for a narrow sliver of road near the center line that I could see. Major panic started to set in as I passed the vehicles, which turned out to be about 3 Yolo County Sheriff's vehicles. After I passed, I glanced back in my rear view mirror and was struck by red and blue LED flashing lights. I let out a scream of agony. I suffered significant emotional trauma from this event.

January 12, 2025 – Glenside, PA – Photophobia

I had a recent situation in the movie theater while watching "Wicked" that sent me into a blackout paranoid state; after leaving the theater, the oncoming auto lights/traffic lights/police lights just exacerbated the situation. I have no memory of the evening. I went to the emergency room in the morning and blood/urine tests showed no drugs or alcohol. I do not have epilepsy and have no medical

conditions. I have been using candlelight and red lights at night in my home since 2020 and rarely drive (2018 car with only 17,000 miles). I had a similar event about two years ago after watching a TV series that used flashing strobe lights. I have a PhD and have been looking for research and case studies on the topic of the health consequences of light/flashing lights at night. My goal is to 1) figure out what happened to me, and 2) help others who would just attribute this to being “crazy.” Thank you!

November 25, 2024 – Vacaville, CA – Autism

I was driving East on E. Monte Vista Ave. when I struck by the LED flashing lights on an RRFB. Instead of the RRFB making me stop, I start yelling fuck, fuck, fuck, fuck, fuck, fuck as I tilted my head down and drove straight through to escape the LED assault and save my life.

November 22, 2024 – Springfield, MO – Migraine

After a TBI years ago, I am now a migraine sufferer. I cannot look at the flashing or strobe lights without instant pain. It has been so hard to safely pass by emergency vehicles as flashing and LEDs both blind and cause instant splitting pain. Trying to get by a wreck or incident is really really tough while you are trying go around and not hit people or cars in the road. I have literally stopped my car in the middle of the road at night, even on a curve, multiple times because I was so blind I could not see the road, the other vehicle – nothing! It’s as if someone suddenly blindfolded me while driving. How are people navigating this terrible issue? Tonight was a little darker than usual, without a moon, and I was struggling to repeatedly get blinded/see on a long 2-lane rural road. Going over a curvy set of river bridges with rails was terrifying, leaving me blinded for a moment trying to navigate curves. Halfway through the 7-mile trip, the repeated brightness moved to migraine, nausea, and fear I was going to wreck. I was literally wondering what my future holds if I can’t drive to see my kids, or even get home from work safely after dark because of these lights. It feels like no one cares – even insurance companies. They HAVE to know; they drive too! Even LED Christmas lights are too much when flashing. We also been blinded by directly placed LED garage lights on houses recently. It’s like a direct police spotlight at a T-intersection. I can’t see if anyone is coming to the left, due to one homeowners LED beacon staying trained right in my eyes. Tonight, I also made a right turn at a 4-way stop. Because of being blinded mid-turn, I couldn’t tell how close the car waiting to turn was in front of me as I rounded to the next road. Not only did I fear hitting the other car right in the door I heard a sickening crunch as my back tire fell off the road edge and hit much further than the wheel rim.

November 14, 2024 – Mangonui, New Zealand – Migraine

Swimming in a remote lake, 200m from road access, when a car pulled up flashing the red LED tail lights. I felt immediately nauseated and blacked out with brief loss of consciousness for a few seconds. I came quickly to and swam with difficulty back to the shore having developed blurred vision, pain at the occiput, numb left side of face and left arm (hemiplegic migraine).

October 12, 2024 – Esparto, CA – Autism

I was driving behind a vehicle when it suddenly pulled to the side of the road. Coming towards us was an ambulance with LED flashing lights. I felt like I was electrocuted and was going to go unconscious. I instantly closed my eyes and stopped my car. After a few seconds, a car behind me honked, and when I opened my eyes, the ambulance was already gone. Now I’m suffering the psychological after-effects.

October 11, 2024 – Yolo County, CA – Autism

I was driving East on a County road in the day when a vehicle came towards me with intense, rapidly flashing amber LED lights. I felt panic rushing in and put my arms up to block the assault. Since I now couldn’t see the road, I came to a full stop. Then somebody honked a horn. I moved my arms, and saw that the lead truck had passed, but a wide-load mobile home on a truck was inches from the left side of my car. These LED flashing lights are a menace and violation of our civil rights. My anxiety ran high for 30 minutes after the encounter.

September 16, 2024 – Nashville, TN – Other

I have Mast Cell Activation Syndrome. My body produces an allergic reaction to things that wouldn't normally cause anyone else a problem, including LED lights. My brain interprets the rapid flashing light as if there's something attacking my body, resulting in what we call a "histamine dump." Histamine dumps lower blood pressure. But given I have a condition known as Postural Orthostatic Tachycardia Syndrome, which already gives me low blood pressure, the combination of this condition with MCAS histamine dump causes me to go into hypovolemic shock. It causes the worst pain I've ever known, where my brain is screaming for oxygen and nutrients, fading in and out of being hyperaware of how much pain I'm in only to dissociate from it as a way to protect myself from the mental anguish of that pain. I've almost died from this several times. For almost a decade, I exhibited symptoms of hypovolemic shock at the end of nearly every day, only to be told it was a cervicogenic headache or migraine. Now that I'm diagnosed, I'm on a medication to treat it. But that medication isn't strong enough to counteract the effects of extremely bright LED headlights, let alone LED streetlights. Every time I leave the house at night, I get sick. I'm already disabled my multiple chronic conditions. My life is already limited. I don't know how to live life unable to even go outside at night.

September 14, 2024 – Vacaville, CA – Autism

I was driving at dusk when a fire truck or ambulance suddenly appeared with LED lights flashing. I immediately threw both of my arms in front of my face and hit the brakes to stop the car. I thought that this might be the end of my life. The LED flashing lights are sheer terror and I can't function. After the fire truck/ambulance passed by, I felt like I was going to cry from the emotional trauma. My brain then feels like it's dead even hours later.

August 28, 2024 – Esparto, CA – Autism

I was driving and encountered a utility truck with both sets of headlights turned on. I turned on my non-LED high beams in the hope that the driver would turn off the high beams. Instead, the driver turned on amber LED flashing lights that incapacitated me. I was unable to proceed forward and stopped my car. Instead of driving off, the driver of the utility truck stopped also. My vision and cognitive abilities were severely impaired, with panic setting in. Finally, I started to inch forward, and then so did the utility truck. It seems like the driver was doing it on purpose. After he left, I spent several minutes simply stopped in the middle of the road, trying to breathe and let the panic subside.

August 6, 2024 – Winters, CA – Autism

I was driving on a country road in the daytime. Over 1 mile ahead of me was a utility truck on the side of the road with amber LED flashing lights. For the entire mile, I was either glued to these LED flashing lights, or forcing myself to look away. As I approached the truck, the LED strobe lights were overwhelming and I could not see through the lights. I stopped my car in the road and started to panic. I put my hand in front of my right eye, and then tried to use my left eye to navigate around the truck. It is impossible for me to think or see with these LED flashing lights blasting me and I suffer extreme anxiety and panic.

August 3, 2024 – Onsted, MI – Astigmatism

Led headlights (low beams), white led running lights, LED brake lights, emergency flashing Led lights and Led streetlights have adversely affected my ability to drive safely. I do not drive at dusk or Night anymore unless I have to (for work). I live in Michigan with snow covered roads and the most dangerous aspect of driving is being blasted by someone's Led headlights. I cannot use my rear view or side mirrors anymore because of the vehicles behind me blinding my visions with their Led headlights. I have to constantly shield my eyes to be able to see the road due to oncoming Led headlights. I love nature and now my ability to enjoy the Night skies is ruined because of bright Led lights on at night. I never had any problems driving at night prior to Led headlights. Now driving has become a nightmare and a very

dangerous task. Led headlights should be banned or at least some type of regulation regarding luminance and Kelvin temperature. Many Led low beams are much brighter than halogen highbeams. In addition to the dangers of led headlights being dangerous, they cause me headaches and eye pain. It's common knowledge that blue light is detrimental to the health of humans and don't understand why this type of lighting is being used in the public.

August 3, 2024 – Fountain Hills, AZ – None

Apparently the plan to get drivers off the road is working with the BLINDING LED vehicle headlights. The police LED flashing lights are SUPER BLINDING.

August 3, 2024 – Fort Collins, CO – Other

At 74 and having cataract replaced and it is nearly impossible to drive safely with the blinding blue white glaring LED lights. It is so distracting and frustrating I lose my concentration to drive properly. The lights seem to bounce up and down with a blinding flashing impact. Even police vehicles red and blue flashing on the side of the road are so blinding it is difficult and unsafe to go around them. I can't see what is in front of me. The contrast from dark to blinding flashing lights is too much to see what's in front of me.

August 1, 2024 – London, United Kingdom – Other

Council lawnmower with flashing LED lights drove past me while I was walking along the road. I felt immediate severe head pain, nausea and disoriented, and fell into the roadside ditch. I then vomited, climbed out with blurred vision and pounding head.

July 9, 2024 – Mangonui, New Zealand – Migraine

While traveling in the passenger seat along the state highway felt sudden thunderclap pain to the left occiput passing three flashing LED lights on three diggers repairing the road. My left eye began to stream, my speech became slurred, then dysaesthesia to the left side of my face and arm occurred. I felt as though I had a concussion. The symptoms of this hemiplegic migraine event resolved gradually over a three day period.

June 1, 2024 – Fairfield, CA – Autism

During the day, I was driving a vehicle on a freeway when I struck by an LED flashing light from a bicycle on a parallel road. I reactively closed my eyes and then suffered a seizure reaction, which I would describe as like an electrical shock and loss of cognitive functioning and vision. I then had to emotionally fight off a panic attack.

4/21/2024 – Beaverton, OR – Autism

LED flashing lights cause me to suffer severe anxiety, panic attacks, and fear.