

6540000 MIDBLOCK CROSSWALK ENHANCEMENT ASSEMBLIES
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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Comments: (6-22-18)

I am looking at the in-roadway light changes to section 654, and specifically the line "In-roadway light assemblies must have a minimum luminance of 101 candelas per square meter." I'm not sure I understand this intensity requirement. Shouldn't the optical intensity be in candelas, similar to circular beacons and RRFB light bars? Luminance is usually for "emitted light from a large area source", whereas candela is "emitted light from a ~point source" or when the steradians are defined. You wouldn't know what intensity the driver would see or at what distance, since we don't know the area of the light source. The traffic engineer would need to know the area of the in-roadway LED emitter (or optical area) X 101 cd/m² = XXX cd the driver would see. And candela then gives you the viewable distance of a light source under certain ambient lighting conditions (e.g. fog, day, night). As well, I would expect some sort of viewing angle or output pattern for the LEDs (again, similar to other signaling devices like beacons and RRFBs). Without an output pattern, the manufacturers could focus the light like a laser beam or make it very wide and dim. Lastly, I don't see chromaticity/color requirements for IRWL. Or, I'm just missing the reference. I'm assuming it would be the same as all other yellow signaling beacons. We don't manufacture IRWL; I actually went into 654 to just see the RRFB changes as it moves to MUTCD interim approval IA-21. I just happened to bump into the IRWL bits.

Response:

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Comments: (6-28-18)

We are kindly requesting the following to be added after the following paragraph 654-2.1 In-Roadway Light Assemblies)The luminance of the in-roadway light assemblies shall must have be a minimum luminance of 101 candelas per square meter. The intensity of the In-Roadway light assemblies shall meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 for Class 2 is certified at 50 Candelas (Directional Flashing Optical Warning Devices for Maintenance or Service Vehicles). Solar powered in-roadway units must be designed to operate for minimum of 100 activations per day and provide 10 days of cloudy operation or 2 days of operation without sunlight. Each activation must be 20 seconds in duration.

654-2.1.1 In-Roadway Flashing Combination: In-roadway light assemblies can be combined with post mounted midblock assemblies as long as both systems flash at the same rate in accordance with MUTCD, Chapter 4N. Explanations: There are three Classes under SAE J595: Class 3 is certified at 20 cd's (candela) and used for identification only on vehicles such as forklifts, people carts in airports, etc. Class 2 is certified at 50 cd's and used primarily with

maintenance or service vehicles. Class 1 is certified at 200 cd's and is used by police, fire and ambulance vehicles for signaling motorist to yield right of way. Class 1 indication is visible up to 1000 feet in daytime (and up to 1 mile at night). The Class 1 light intensity contributes to the effectiveness of motorist to "yield to pedestrians" (high 80% and close to 100%) compared to standard flashing beacons (15% - 20%). Does size of the LED indication matter That provides initial guide on the level of brightness needed. Light changes brightness as the square of the distance: • Using 200 cd at 1000': $(1000/500 \text{ feet})^2 = 1/4\text{th}$ so we would need 50 cd for a 500' range. AASHTO /FDOT stopping sight distance for 45 MPH is 360 feet. The 50 cd brightness and visibilities at 500 feet exceed the minimum stopping sight distance. Pedestrian crossing as per ITE is 3 feet per second. The 20 seconds will accommodate 60 feet of pavement (60 feet / 3 feet/second = 20 seconds). That is the maximum possible midblock crossing of 5 lanes. The 10 days of cloudy or 2 days without sunlight reflects real life conditions.

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Thank you for your cooperation and understanding.

Response:
