

FHWA MUTCD requirements for radar speed feedback signs in changeable message sign (CMS) category

Note: these guidelines are based on the 2009 edition (with 2012 revisions) of the Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD). Your state and/or local jurisdiction may have different requirements for radar speed feedback sign design and placement standards to meet their unique safety concerns.

Current MUTCD: <https://mutcd.fhwa.dot.gov/html/2009r1r2/part2/part2i.htm> and https://mutcd.fhwa.dot.gov/resources/interpretations/2_09_174.htm

Summary of Letter Height for YOUR SPEED and LED digits

The table below summarizes the minimum LED digit height and minimum static sign character height. Note that YOUR SPEED character height is implied to match the required SPEED LIMIT characters:

Posted speed	Low-volume road	Conventional road – single lane	Conventional road – multi-lane
< 45 mph	4" YOUR SPEED 12" LED digits	4" YOUR SPEED 12" LED digits	5" YOUR SPEED 12" LED digits
≥ 45 mph	6" YOUR SPEED 18" LED digits	6" YOUR SPEED 18" LED digits	6" YOUR SPEED 18" LED digits

The table below summarizes what applications different static sign colors (sign sheeting) may be used in:

Static sign background color	Application
White	Not FHWA standard
Yellow	All
Fluorescent Yellow/Green	When installed in school zones
Orange	When being used in work zones

LED Digit Display Color

The MUTCD calls the LED digits the sign “legend,” and the backing of the digits on the sign the “background” for changeable message signs. It covers the legend and background color requirements in Table 2A-5

Link: <https://mutcd.fhwa.dot.gov/html/2009/part2/part2a.htm#table2A05>

The MUTCD references radar speed feedback signs in Chapter 2 when discussing speed limit signs. **It notes the digit color should be yellow on a black background.**

Section 2B.13.20

Guidance: If a changeable message sign displaying approach speeds is installed, the legend YOUR SPEED XX MPH or such similar legend should be displayed. The color of the changeable message legend should be a yellow legend on a black background or the reverse of these colors.

Link: https://mutcd.fhwa.dot.gov/hdm/2009/part2/part2b.htm#section2B13_para20



Static Sign Color (sheeting)

These are the MUTCD guidelines on sign type:

Section 2A.05.01

Standard: Signs shall be defined by their function as follows:

- A. *Regulatory signs give notice of traffic laws or regulations.*
- B. *Warning signs give notice of a situation that might not be readily apparent.*
- C. *Guide signs show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information.*

Link: https://mutcd.fhwa.dot.gov/hdm/2009/part2/part2a.htm#section2A05_para01

The MUTCD provides a table of common sign colors with a section for changeable message signs. Below is a condensed version showing only the changeable message sign colors:

Type of Sign	Legend Color	Background Color
Regulatory	White, Red (for circle/slash/other red elements of a similar static regulatory sign only)	Black
Warning	Yellow	Black
Temporary Traffic Control	Yellow, Orange	Black
Guide	White	Black

<https://mutcd.fhwa.dot.gov/hdm/2009/part2/part2a.htm#table2A05>

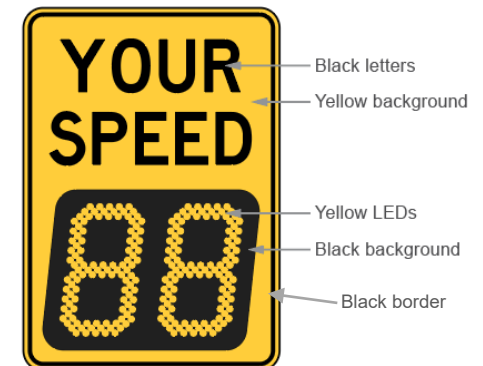
The MUTCD recommends white legends for “Regulatory” signs. It does not recommend that radar speed feedback signs have a white legend/LED color; therefore, they are not “Regulatory” signs.

The MUTCD notes in Section 2B.13.20 (cited above) that radar speed feedback signs should have a “*yellow legend on a black background or the reverse of these colors.*” With reference to the table above, radar speed feedback signs fit into the “Warning” sign category. The MUTCD requires that warning signs have a black legend with a yellow background:

Section 2C.03.01

Standard: Except as provided in Paragraph 2 or unless specifically designated otherwise, all warning signs shall be diamond-shaped (square with one diagonal vertical) with a black legend and border on a yellow background.

Link: https://mutcd.fhwa.dot.gov/hdm/2009/part2/part2c.htm#section2C03_para01



The static portion of radar speed feedback signs should have a yellow background with black “YOUR SPEED” letters, and the changeable message portion should have a black background with yellow LEDs.

Specific Radar Speed Feedback Sign Mentions in the MUTCD

Radar speed feedback signs are specifically mentioned in two chapters in the MUTCD: Chapter 2B on Regulatory Signs, Barricades, and Gates, and Chapter 2L on Changeable Message Signs. **These signs are categorized as “Changeable Message Signs” within the MUTCD.** Here are the specific references to radar speed feedback signs.

Section 2B.13.19

Option: A changeable message sign that displays to approaching drivers the speed at which they are traveling may be installed in conjunction with a Speed Limit sign.

Link: https://mutcd.fhwa.dot.gov/htm/2009/part2/part2b.htm#section2B13_para19

Section 2B.13.20

Guidance: If a changeable message sign displaying approach speeds is installed, the legend YOUR SPEED XX MPH or such similar legend should be displayed. The color of the changeable message legend should be a yellow legend on a black background or the reverse of these colors.

Link: https://mutcd.fhwa.dot.gov/htm/2009/part2/part2b.htm#section2B13_para20

Section 2L.02.07

Support: Section 2B.13 contains information regarding the design of changeable message signs that are used to display variable speed limits that change based on ambient or operational conditions, or that display the speed at which approaching drivers are traveling.

Link: https://mutcd.fhwa.dot.gov/htm/2009/part2/part2l.htm#section2L02_para07

LED Digit Size

The MUTCD gives specific requirements for the radar speed feedback sign letter height.

Section 2L.04.06

*Guidance: Except as provided in Paragraph 18, word messages on changeable message signs should be composed of all upper-case letters. **The minimum letter height should be 18 inches for changeable message signs on roadways with speed limits of 45 mph or higher. The minimum letter height should be 12 inches for changeable message signs on roadways with speed limits of less than 45 mph.***

Link: https://mutcd.fhwa.dot.gov/htm/2009/part2/part2l.htm#section2L04_para06



While it does not specifically mention letter width, the MUTCD notes that the width-to-height ratio of the characters must be relatively square.

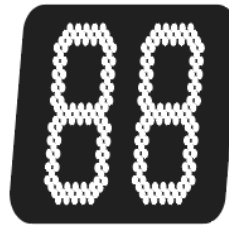
Section 2L.04.06

Guidance: The width-to-height ratio of the sign characters should be between 0.7 and 1.0. The stroke width-to-height ratio should be 0.2.

Link: https://mutcd.fhwa.dot.gov/hdm/2009/part2/part2l.htm#section2L04_para08



Compliant width-to-height
ratio of 0.7



Non-compliant width-to-height
ratio of 0.4

“YOUR SPEED” Letter Height and Legibility

While the MUTCD does not specifically state the letter height requirements for the static portion of radar speed feedback signs (“YOUR SPEED”), it does note general letter height requirements for other sign types – specifically the “YOUR SPEED” sign should be paired with a “SPEED LIMIT” (R2-1) sign and be similar letter heights and dimensions

See SUMMARY OF LETTER HEIGHT table on page 1.

Section 2A.13.02

Guidance: Word messages should be as brief as possible, and the lettering should be large enough to provide the necessary legibility distance. A minimum specific ratio of 1 inch of letter height per 30 feet of legibility distance should be used.

Link: https://mutcd.fhwa.dot.gov/hdm/2009/part2/part2a.htm#section2A13_para02

While this standard is for Guide Signs specifically, Speed Limit signs and others follow similar requirements. Most Speed Limit signs have a minimum letter height of 6 inches.

Good legibility is crucial for radar speed feedback signs. Below are the MUTCD requirements for changeable message sign legibility.

Section 2L.02.04

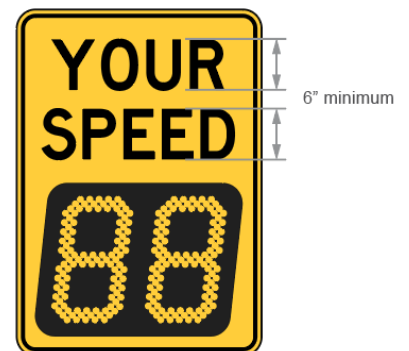
*Guidance: Changeable message signs used on roadways with speed limits of 55 mph or higher should be visible from 1/2 mile under both day and night conditions. **The message should be designed to be legible from a minimum distance of 600 feet for nighttime conditions and 800 feet for normal daylight conditions.***

When environmental conditions that reduce visibility and legibility are present, or when the legibility distances stated in the previous sentences in this paragraph cannot be practically achieved, messages composed of fewer units of information should be used and consideration should be given to limiting the message to a single phase.

Link: https://mutcd.fhwa.dot.gov/hdm/2009/part2/part2l.htm#section2L03_para04



Roads less than 45 mph



Roads equal/greater
than 45 mph

Installation Location

The MUTCD recommends that:

Section 2L.06.01

Guidance: A CMS that is used in place of a static sign (such as a blank-out or variable legend regulatory sign) should be located in accordance with the provisions of Chapter 2A. The following factors should be considered when installing other permanent changeable message signs:

D. Changeable message signs should not be positioned at locations where the information load on drivers is already high because of guide signs and other types of information.

E. Changeable message signs should not be located in areas where drivers frequently perform lane-changing maneuvers in response to static guide sign information, or because of merging or weaving conditions.

Link: https://mutcd.fhwa.dot.gov/html/2009/part2/part2l.htm#section2L06_para01

It does also state that changeable messages signs should supplement conventional signs rather than substitute them.

Section 2L.04.03

Guidance: Except in the case of a limited-legend CMS (such as a blank-out or electronic-display changeable message regulatory sign) that is used in place of a static regulatory sign or an activated blank-out warning sign that supplements a static warning sign at a separate location, changeable message signs should be used as a supplement to and not as a substitute for conventional signs and markings.

Link: https://mutcd.fhwa.dot.gov/html/2009/part2/part2l.htm#section2L04_para03

Some states may also recommend installing radar speed feedback signs on the same post as speed limit signs. While this is effective in most cases, there may be certain situations where installing a radar speed feedback sign on its own post separate from a speed limit sign is more effective. Keep in mind that some judgment is required to ensure the information load on drivers is not too high.



Radar speed feedback sign installed on same post as Speed Limit sign



Radar speed feedback sign installed on separate post

Flashing Strobes on Radar Speed Feedback Signs

The MUTCD notes twice that rapid flashing effects are not to be used on changeable message signs.

Section 2L.04.01

Standard: Changeable message signs shall not include advertising, animation, rapid flashing, dissolving, exploding, scrolling, or other dynamic elements.

Link: https://mutcd.fhwa.dot.gov/htm/2009/part2/part2l.htm#section2L04_para01

Section 2L.05.05

Standard: Techniques of message display such as fading, rapid flashing, exploding, dissolving, or moving messages shall not be used. The text of the message shall not scroll or travel horizontally or vertically across the face of the sign.

Link: https://mutcd.fhwa.dot.gov/htm/2009/part2/part2l.htm#section2L05_para05

After being asked for an official interpretation of whether this applies to radar speed feedback signs, the MUTCD clarified its position:

Interpretation Letter 2(09)-79 (I) - Radar Speed Feedback Signs

*"[I]t is the FHWA's interpretation that the MUTCD **specifically prohibits the use of flashing displays and strobe light technology** on changeable message signs to include radar speed feedback signs."*

Link: https://mutcd.fhwa.dot.gov/resources/interpretations/2_09_79.htm

Other radar speed sign references are available.

Click to learn more:

- [Radar Speed Signs Application Guide](#)
- [School Zone Safety: Radar Speed Signs \(9 min. video\)](#)