

# Quality Standards for Temporary Traffic Control Devices and Acceptable Delineation Methods for Vehicles



The Ohio Department of Transportation

Office of Traffic Engineering

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## Quality Standards for Temporary Traffic Control Devices

### Introduction

Temporary traffic control devices are a necessary part of highway work zones. These devices warn motorists of hazards, advise them of the proper path through the work area, delineate areas where they may not operate and separate them from workers and opposing traffic. This is accomplished by a system of devices. The success of this system depends on the visibility of each device at the time of the project's initial installation as well as throughout the life of the project. Since it is not practical to require new devices at all times, standards are needed to evaluate the condition of the devices to assure their continued effectiveness. The standards in this publication should aid in the determination of the quality of work zone traffic control devices.

This standard has been developed in an effort to offset the deterioration in the effectiveness of work zone traffic control devices. A determination of the device quality should be made at several stages: while in storage, during preparation for delivery to the jobsite, during initial set up and periodically during the course of the work.

These standards are intended to address the day-to-day operations of traffic control within a work zone and are not meant to cover the needs of emergency situations.

All devices and combinations of devices shall meet the requirements of the National Cooperative Highway Research Program (NCHRP) Report 350 for their respective categories.

### Quality Classifications and Requirements

The quality of work zone traffic control devices in this standard has been divided into three categories: acceptable, marginal, and unacceptable. The Engineer shall be the sole judge as to the acceptability of placement and maintenance of all traffic control devices.

At the time of the **initial set-up and at the time of major stage changes 100%** of each type of device (sign, barricade panels and vertical panels, channelizing device, warning lights, arrow panels, portable changeable message signs, temporary pavement markings and raised pavement markers) shall be classified as **acceptable**. Throughout the duration of the project, the percentage of **acceptable devices may decrease to 75% (25% marginal)** only as a result of damage and/or deterioration during the course of the work. Any **unacceptable device shall be replaced within 12 hours of notification**.

**Acceptable:** Devices that meet the quality requirements herein for this classification and all other requirements in the plans and specifications shall be determined to be acceptable for use on highway construction or contract maintenance projects.

**Marginal:** Devices in this category shall not be delivered to the jobsite. Devices that meet the quality criteria for marginal as described herein may remain in the work zone until they reach 25% or until it is determined that they have become unacceptable.

**Unacceptable:** Devices in this category shall not be delivered to the jobsite. When found in the work zone, they must be removed and replaced within 12 hours of notification.

All devices and device supports shall remain in a position where good visibility can be maintained at all times. **Any position that prohibits visibility automatically renders the device unacceptable.**

The following photographs, together with the contract requirements of each specific project, shall be used as a guide to determine if the device is acceptable, marginal or unacceptable. A direct comparison of each device to this standard is not required for the rejection of devices; however, this standard shall be used to resolve disputes.

### **Quality Standard for Signs**

**Acceptable:** To be considered acceptable, a sign shall meet all of the following conditions.

- There may be abrasions on the surface, but very little loss of lettering.
- The sign face is free of any residue.
- There has been no touch-up of lettering.
- The message is legible both day and night.
- The back side is free of reflective materials except for identification markings and has a bare surface. The identification markings shall be no more than 1 inch in character height.

**Marginal:** The sign is considered marginal if it meets any of the following conditions.

- There are many surface abrasions on the sign face, and only a few are within the individual letters of the message.
- Some color fading may be evident, but the background color and reflectivity are still apparent at night.

**Unacceptable:** The sign is considered unacceptable if it meets any of the following conditions.

- Asphalt splatter, cement slurry, or abrasions are evident throughout the face of the sign.
- A letter has a loss of more than fifty percent (50%) or more of its stroke area or portions of letters are missing making it confusing to identify.
- There is noticeable color fading or loss of reflectivity is noticeable at night.
- The message is illegible.
- The sign has bends or dents that alter the size and/or shape of the sign.



**Acceptable**



**Marginal**



**Unacceptable**

## **Quality Standard for Barricade and Vertical Panels**

**Acceptable:** To be acceptable, the panel shall meet all of the following conditions.

- Panels are not deformed to an extent so as to decrease the panels target value.
- There may be several abrasions on the surface but very little loss of reflective sheeting.
- The orange is vivid and the stripes provide contrast that is clearly visible with low beam headlights at night.

**Marginal:** The panel is considered marginal if it meets any of the following conditions.

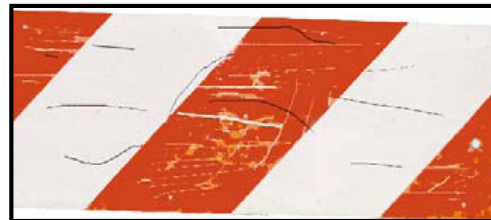
- There are many surface abrasions through the panel surface.
- Some color fading is evident; however, it has no large areas of residue or missing reflective material.

**Unacceptable:** A panel is considered unacceptable if it meets any of the following conditions:

- The surface is marred over a high percentage of the panel area.
- There is a noticeable loss of reflectivity and obvious color fading.
- Panels with asphalt splatter and/or cement slurry, or any combination of missing and covered reflective material would make the panel unacceptable.
- Deformation of the support assembly so the sheeted panel is non-parallel to the roadway surface.
- Rusty metal parts or unpainted wooden rails.



**Acceptable**



**Marginal**



**Unacceptable**

## **Quality Standard for Channelizing Devices**

**Acceptable:** To be considered acceptable, a channelizing device shall meet all of the following conditions:

- Surface is free of asphalt splatter, cement slurry or other material and will readily clean.
- The device's shape should remain clearly identifiable with no significant distortion and must be free standing in its normal position.
- Surface is free of punctures and abrasions.
- The reflective bands have little or no loss of reflectivity, with only minor tears and scratches.
- Any dents do not seriously reduce the reflectivity of the sheeting.

**Marginal:** The channelizing device is considered marginal, if it meets any of the following conditions:

- The surface has some asphalt splattering or cement slurry and may not be readily cleaned due to abrasions and discoloration.
- The reflective bands have numerous tears and scratches; but have no large areas of residue or missing reflective material.
- Any dents that do not reduce the strength of the device.
- The device maintains its intended shape.
- No more than one device in a row is missing.

**Unacceptable:** A channelizing device is considered unacceptable if it meets any of the following conditions:

- Punctures and large areas stained with asphalt splatter or cement slurry that cannot be cleaned due to abrasions or discoloration.
- There is noticeable fading of the device's color.
- Large areas of missing or stained reflective material.
- Substantial deformation of a device, which reduces the original dimensions, or the device has lost the intended shape.
- Several dents or fractures that affect stability or ability to retain the reflective sheeting.



**Acceptable**



**Marginal**



**Unacceptable**

### **Quality Standard for Warning Lights**

**Acceptable:** To be acceptable, the warning lights shall meet all of the following conditions.

- One hundred percent (100%) of all warning lights shall be operating properly. Any warning light that is out of alignment from the intended driver's line of vision is considered not operating properly.

**Marginal:** The warning lights are marginal when all of the following conditions exist.

- At least ninety percent (90%) of the warning lights are operating properly.

**Unacceptable:** The warning lights are unacceptable when any of the following conditions exist.

- Less than ninety percent (90%) of the lights are operating properly.

### **Quality Standard for Flashing Arrow Panel**

***(Flashing Arrow Mode or Sequential Arrow)***

**Acceptable:** To be acceptable, the arrow panel shall meet all of the following conditions.

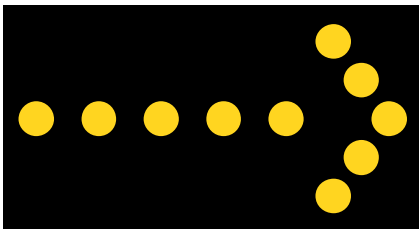
- All lamps are working.
- All lamps dim properly.
- All lamps are the same level of intensity.

**Marginal:** An arrow panel is marginal when it meets the following condition.

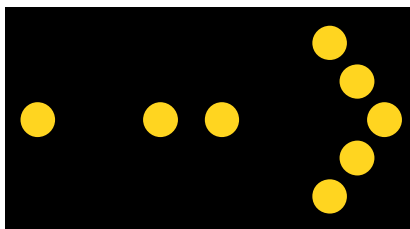
- Two (2) or less lamps are not working (none in the head) and the lamps all dim properly..
- No more than two (2) lamps are at a different level of intensity.

**Unacceptable:** An arrow panel is considered unacceptable when any of the following conditions exist.

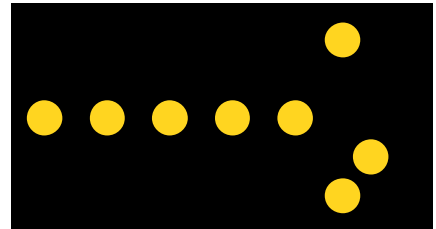
- Three (3) or more lamps are not working.
- One (1) or more lamps are not working in the head.
- The lamps are not dimming properly.
- More than two (2) lamps are at a different level of intensity.



**Acceptable**



**Marginal**



**Unacceptable**



### ***(Chevron Mode)***

**Acceptable:** To be acceptable, the arrow panel shall meet all of the following conditions.

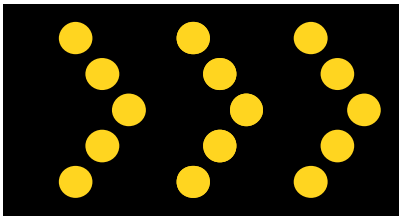
- All lamps are working.
- All lamps dim properly.
- All lamps are the same level of intensity.

**Marginal:** An arrow panel in this mode is considered marginal when it meets the following condition.

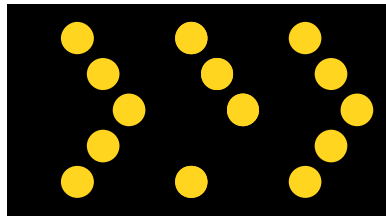
- No more than one (1) lamp not working in any chevron segment and the lamps all dim properly.
- No more than two (2) lamps are at a different level of intensity.

**Unacceptable:** An arrow panel is considered unacceptable when any of the following conditions exist.

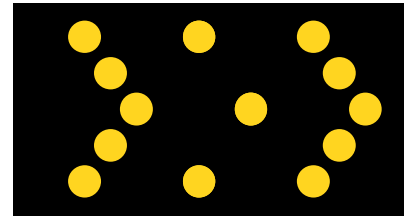
- Two (2) or more lamps not working in any one chevron.
- The lamps are not dimming properly.
- More than two (2) lamps are at a different level of intensity.



**Acceptable**



**Marginal**



**Unacceptable**

### ***(Caution Mode – Bar or Corners)***

**Acceptable:** To be acceptable, the arrow panel shall meet all of the following conditions.

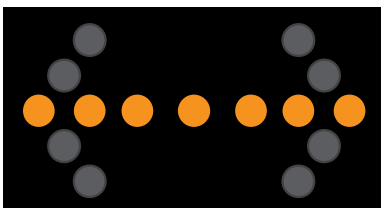
- No lamps are burned out.
- All lamps are the same level of intensity.
- All lamps dim properly.

**Marginal:** An arrow panel is considered marginal when it meets the following condition.

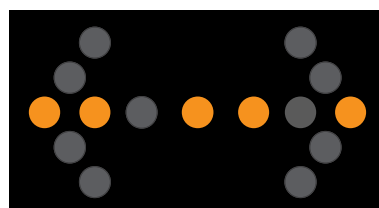
- Minimum of four (4) lamps are operating and the lamps all dim properly.
- No more than two (2) lamps are at a different level of intensity

**Unacceptable:** An arrow panel is considered unacceptable when any of the following conditions exist.

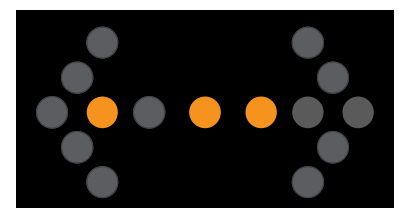
- Less than four (4) lamps are operating.
- The lamps are not dimming properly.
- More than two (2) lamps are at a different level of intensity.



**Acceptable**



**Marginal**



**Unacceptable**

***(Double Arrow Mode)***

**Acceptable:** To be acceptable, the arrow panel shall meet all of the following conditions.

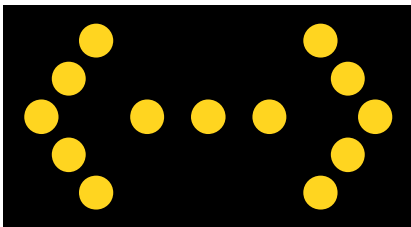
- No more than one (1) lamp out in stem and none out in head.
- All lamps dim properly.
- All lamps are the same level of intensity.

**Marginal:** An arrow panel is considered marginal when it meets the following condition.

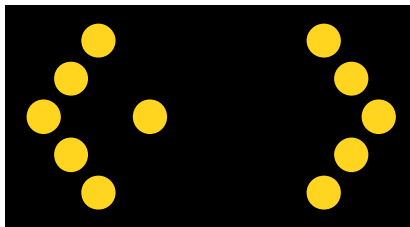
- No more than two (2) lamps out in stem and none out in head and dimming properly.
- No more than two (2) lamps are at a different level of intensity.

**Unacceptable:** An arrow panel is considered unacceptable when any of the following conditions exist.

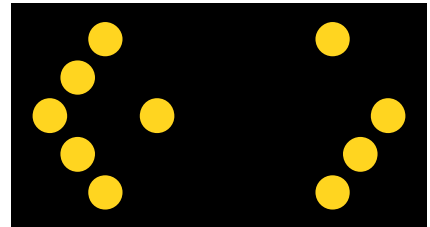
- More than two (2) lamps out in stem.
- One (1) or more lamp out in either head.
- The lamps are not dimming properly.
- More than two (2) lamps are at a different level of intensity.



**Acceptable**



**Marginal**



**Unacceptable**



## Quality Standard for Portable Changeable Message Sign

**Acceptable:** To be acceptable, a PCMS shall meet the following condition.

- One hundred percent (100%) of the pixels per character module shall be operating properly.
- All lamps dim properly.
- All lamps are the same level of intensity.

**Marginal:** A PCMS is marginal when it meets the following condition.

- At least ninety percent (90%) of the pixels per character module shall be operating properly.
- No more than two (2) lamps are at a different level of intensity.

**Unacceptable:** A PCMS is considered unacceptable if it meets any of the following conditions.

- Less than ninety percent (90%) of the pixels per character module are operating properly.
- The lamps are not dimming properly.
- More than two (2) lamps are at a different level of intensity.



**Acceptable**



**Marginal**



**Unacceptable**

## Quality Standard for Temporary Pavement Markings

**Acceptable:** Pavement marking tape or paint is acceptable when it meets the following condition.

- All material (solid lines and dash lines) is in place and meets all material specifications.
- Less than 10% of solid line is missing.

**Marginal:** Pavement marking tape or paint is marginal when it meets any of the following conditions.

- Less than ten percent (10%) of message or symbol is missing.
- Two (2) or less consecutive dash lines are missing.
- Less than 20% of solid line is missing.

**Unacceptable:** Pavement marking tape or paint is considered unacceptable if any of the following conditions apply.

- More than ten percent (10%) of tape, paint, message or symbol is missing.
- More than two (2) consecutive dash lines are missing.
- More than 20% of solid line is missing.

## **Quality Standard for Work Zone Raised Pavement Markers**

**Acceptable:** WZRPMs are acceptable when they meet the following condition.

- All WZRPMs are in place.

**Marginal:** WZRPMs are marginal if any of the following conditions are met.

- 10 percent (10%) or less of all WZRPMs are missing.
- Three (3) or less consecutive WZRPMs are missing.

**Unacceptable:** WZRPMs are considered unacceptable if any of the following conditions exist.

- More than ten percent (10%) of all WZRPMs are missing.
- More than three (3) consecutive WZRPMs are missing.

## Quality Standard for Temporary Concrete Barrier

**Acceptable:** To be acceptable, the temporary barrier shall meet all of the following conditions.

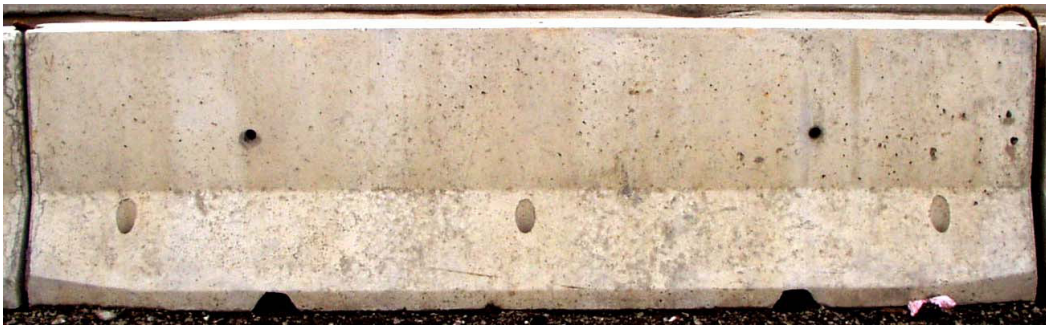
- The wall shall appear new with few minor blemishes.
- Spalls and chipped concrete are not greater than one and one-half (1.5) inches in depth.
- The connecting loops are all sound and in place with no broken strands.

**Marginal:** Temporary barrier is considered marginal when it meets the following conditions.

- The wall has minor spalls with hairline cracks and minor imperfections along the base but is still structurally sound.

**Unacceptable:** Temporary barrier is considered unacceptable when any of the following conditions exist.

- The wall has large spalls and cracks, with unsound concrete that could be easily removed when hit.
- The spalls are greater than one and one-half (1.5) inches in depth or connecting loop is broken or damaged
- One (1) or more connecting loop is missing.



**Acceptable**



**Marginal**



**Unacceptable**

## Acceptable Delineation Methods for Vehicles

ODOT Construction and Material Specification 614.03 contains requirements for the delineation of work vehicles (also see Supplemental Specification 800).

The following figures depict acceptable methods of delineating material supply vehicles:





Additional examples of acceptable delineation of material supply vehicles

