Since February 1977, the American Traffic Safety Services Association has provided quality roadway safety education and training to our industry. ATSSA's progressive and innovative approach to education transitioned what was once known in our industry as ATSSA training into the ATSSA Roadway Safety Training Institute (RSTI) The institute provides a "dynamic" selection of comprehensive training and certification programs to our industry.

The benefits that an individual, company, organization or agency receives by attending ATSSA's roadway safety training courses or pursuing ATSSA certification are tremendous. Many states now require training or certification to work on our nation's roadways and ATSSA's Roadway Safety Training Institute is a recognized leader in this field.

Call ATSSA's training department to schedule a class today—(877) 642-4637

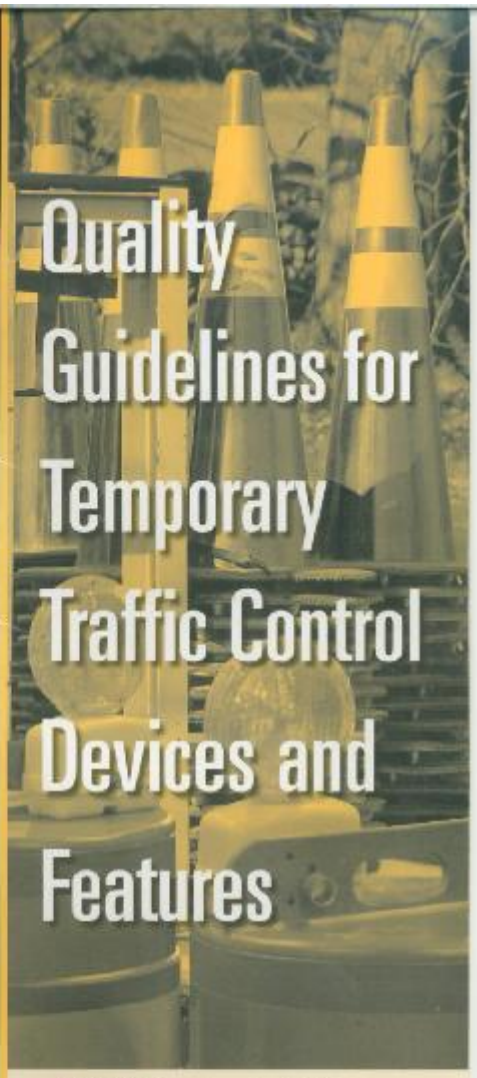
■ ■ ■

American Traffic Safety Services Association
15 Riverside Parkway, Suite 100
Fredericksburg, VA 22406
(540) 368-1701 • Fax (540) 368-1717
www.atssa.com

QS

ROADWAY SAFETY TRAINING INSTITUTE

Quality Guidelines for Temporary Traffic Control Devices and Features



ATSSA American Traffic Safety Services Association

2008-09 edition

Since 1969, the American Traffic Safety Services Association (ATSSA), an international trade association, has represented companies and individuals in the traffic control and roadway safety industry. ATSSA's 1800+ members provide the majority of traffic safety features, services, and materials used on America's roadways. These include guardrails, striping, signage, lighting, drums, cones, and barricades. ATSSA members make our nation's roadways safer. ATSSA is committed to an environment where roadway safety is always improving. ATSSA is a leader in roadway safety issues, with a heavy emphasis on work zone safety, pavement markings, signage, and traffic control safety devices. Headquartered in Fredericksburg, Virginia, ATSSA is also the leader in work zone safety training and products.

American Traffic Safety Services Association
(540) 368-1701
FAX (540) 368-1717

23 CFR Part 630 –
Temporary Traffic Control Devices:

630.110 –
Maintenance of Temporary Traffic Control Devices:

To provide for the continued effectiveness of temporary traffic control devices, each agency shall develop and implement quality guidelines to help maintain the quality and adequacy of the temporary traffic control devices for the duration of the project. Agencies may choose to adopt existing guidelines such as those developed by the American Traffic Safety Services Association (ATSSA) or other state highway agencies.

For more information, please visit us at
www.atssa.com

CONTENTS

■ ■ ■

A special thank you to all ATSSA members who sent us photos of your products. ATSSA is constantly looking for ways to improve this booklet. If you have suggestions that would improve the booklet, please email them to Kelly Covington at kellyc@atssa.com

INTRODUCTION

The Federal Manual on Uniform Traffic Control Devices (MUTCD) provides the following support guidance in Section 1A.01 on Temporary Traffic Control (TTC) devices.

> *"The purpose of traffic control devices, as well as the principles for their use, is to promote highway safety and efficiency by providing for the orderly movement of all road users on streets and highways throughout the Nation.*
>
> *Traffic control devices notify road users of regulations and provide warning and guidance needed for the reasonably safe, uniform, and efficient operation of all elements of the traffic stream."*

Traffic controls are a necessary part of TTC zones to warn motorists of hazards, advise them of the proper path through the zone, delineate areas where they may not operate, and to separate them from the workers. This is accomplished by the deployment of a system of devices. The success of this system depends on the visibility of each device at the time of a 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, guidelines are needed by which the condition of used devices can be evaluated to assure continued effectiveness. The guidelines in this publication should aid in the determination of the quality of used devices.

The use of TTC zone devices subjects them to wear that does not occur with permanent devices. Much of this wear occurs during the

storage, shipment, installation, relocation, and removal of devices causing deterioration in appearance. Whenever a high number of these worn and damaged devices appear on the same project, the general appearance of the TTC zone deteriorates, reducing the level of safety provided to the workers, pedestrians, and traveling public.

These guidelines have been developed in an effort to offset the deterioration in appearance of TTC zone devices. A determination of the condition of device quality should be made at several stages: while in storage, during preparation for delivery to the TTC zone, during initial set up and periodically during the course of the work. Suppliers and contractors are encouraged to apply this guideline prior to delivery of devices to the jobsite. Doing so will minimize agency involvement and reduce costs related to on-site replacement.

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

FHWA policy requires that all roadside appurtenances such as traffic barriers, barrier terminals and crash cushions, bridge railings, sign and light pole supports, and TTC zone hardware used on the National Highway System meet the crashworthy performance criteria contained in the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features". The FHWA website at **http://safety.fhwa.dot.gov/programs/roadside_hardware.htm** identifies all such hardware

and includes copies of FHWA acceptance letters for each of them. In the case of proprietary items, links are provided to manufacturers' websites as a source of detailed information on specific devices. The website also contains an "Ask the Experts" section where questions on roadside design issues can be addressed. State Departments of Transportation and local agencies might also have expanded the NCHRP Report 350 crashworthy criteria to apply to other highways in addition to the National Highway System.

Crashworthiness and crash testing information on devices described in Part 6 of the MUTCD are found in AASHTO's "Roadside Design Guide."

High-Visibility Apparel — all workers exposed to the risks of moving roadway traffic or construction equipment should wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Safety Apparel" (see Section 1A.11), or equivalent revisions, and labeled as ANSI 107-2004 (or current edition) standard performance for Class 1, 2, or 3 risk exposure. A competent person designated by the employer to be responsible for the worker safety plan within the activity area of the job site should make the selection of the appropriate class of garment.

For daytime and nighttime activity, flaggers shall wear safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel" (see Section 1A.11) and labeled as meeting the ANSI 107-2004 (or current edition) standard performance for Class 2 risk exposure. The apparel background (outer) material color shall be either fluores-

cent orange-red or fluorescent yellow-green as defined in the standard. The retroreflective material shall be either orange, yellow, white, silver, yellow green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 300 m (1,000 ft). The retroreflective safety apparel shall be designed to clearly identify the wearer as a person.

QUALITY CLASSIFICATIONS AND REQUIREMENTS

The quality of theTTC zone devices in this guideline has been divided into three categories: acceptable, marginal, and unacceptable.

At the time of the initial set up or at the time of major stage changes, one hundred percent (100%) of each type of device (cones, tubular markers, drums, barricades, vertical panels, signs, warning lights, arrow panels, portable changeable message signs, pavement tape and raised pavement markers) shall be classified as "acceptable". Throughout the duration of the project, the number of acceptable devices may decrease to seventy-five percent (75%) of the initial quantity, as a result of damage and/or deterioration during the course of the work, with the remainder of the devices in the marginal category. Unacceptable devices or situations that are found on the jobsite shall be replaced or the situation corrected within twelve (12) hours of notification or as specified in the contract specifications.

ACCEPTABLE

Devices that meet the quality requirements herein for this classification and all other requirements such as design, size, color, weight, etc. in the plans and specifications shall be considered to be acceptable for use on highway construction or contract maintenance projects.

MARGINAL

The term "Marginal" for the purpose of this manual means "marginally acceptable", reaching the lower end of acceptability. Devices that meet the quality criteria for marginal as described herein may remain in the TTC zone until their number exceeds the specified percentage of that type of device or until it is determined that they have become unacceptable. Should the percentage of devices in the marginal category exceed the specified percentage, the proper number of those devices shall be replaced so as to bring the percent of marginal devices to the specified percentage or less.

UNACCEPTABLE

Devices in this category shall not be delivered to the jobsite. When found in the TTC zone, they shall be replaced or repaired within 12 hours of notification or as contained in the contract specifications.

The following photographs, together with the accompanying description, should be used as a guide to determine if the device is acceptable, marginal or unacceptable. A direct comparison of each device to this guideline is not required for rejection of devices; however, this guideline should be used to resolve disputes. One aid in avoiding potential disputes is to retain samples of devices in each category to supplement the photographs shown in the evaluation guides that follow.

Sample Language for Standard Specifications of the Inspection and Replacement of Temporary Traffic Control Devices

Furnish and maintain traffic control devices that meet the "acceptable" category described in *Quality Guidelines for Temporary Traffic Control Devices* published by ATSSA. Repair or remove and replace "marginal" devices within XX hours*; and repair or remove and replace "unacceptable" devices immediately.

* This time period needs to be determined by the agency.

SECTION 1A.14 ABBREVIATIONS USED ON TRAFFIC CONTROL DEVICES

STANDARD: When the word messages shown in Table 1A-1 (see pages 14-15) need to be abbreviated in connection with traffic control devices, the abbreviations shown in Table 1A-1 (see pages 14-15) shall be used.

GUIDANCE: The abbreviations for the words listed in Table 1A-2 (see page 16) should not be used in connection with traffic control devices unless the prompt work shown in Table 1A-2 (see page 16) either precedes or follows the abbreviation.

STANDARD: The abbreviations shown in Table 1A-3 (see page 16) shall not be used in connection with traffic control devices because of their potential to be misinterpreted by road users.

GUIDANCE: Where multiple abbreviations are permitted in Tables 1A-1 or 1A-2 (see pages 14-16), the same abbreviation should be used throughout a single jurisdiction.

(Table 1A-1, Table 1A-2 and Table 1A-3 found on pages 14-16.)

Table 1A-1. Acceptable Abbreviations

Word Message	Standard Abbreviation
Afternoon / Evening	PM
Alternate	ALT
Avenue	AVE, AV
Bicycle	BIKE
Boulevard	BLVD
Cannot	CANT
CB Radio	CB
Center	CNTR
Circle	CIR
Civil Defense	CD
Compressed Natural Gas	CNG
Court	CT
Crossing (other than highway-rail)	XING
Diesel Fuel	D
Do Not	DONT
Drive	DR
East	E
Eastbound	E-BND
Electric Vehicle	EV
Emergency	EMER
Entrance, Enter	ENT
Expressway	EXPWY
Feet	FT
FM Radio	FM
Freeway	FRWY, FWY
Friday	FRI
Hazardous Material	HAZMAT
High Occupancy Vehicle	HOV
Highway	HWY
Highway-Rail Grade Crossing Pavement Marking	RXR
Hospital	H
Hour(s)	HR
Information	INFO
Inherently Low Emission Vehicle	ILEV
It Is	ITS
Junction / Intersection	JCT
Kilogram	kg
Kilometer(s)	km
Kilometers Per Hour	km/h
Lane	LN
Left	LFT
Liquid Propane Gas	LP-GAS

Acceptable Abbreviations cont.

Word Message	Standard Abbreviation
Maintenance	MAINT
Meter(s)	m
Metric Ton	t
Mile(s)	MI
Miles Per Hour	MPH
Minute(s)	MIN
Monday	MON
Morning / Late Night	AM
Normal	NORM
North	N
Northbound	N-BND
Parking	PKING
Parkway	PKWY
Pedestrian	PED
Place	PL
Pounds	LBS
Right	RHT
Road	RD
Saturday	SAT
Service	SERV
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	S-BND
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Terrace	TER
Thursday	THURS
Tires With Lugs	LUGS
Tons of Weight	T
Traffic	TRAF
Trail	TR
Travelers	TRAVLRS
Tuesday	TUES
Two-Way Intersection	2-WAY
Two-Wheeled Vehicles	CYCLES
US Numbered Route	US
Vehicle(s)	VEH
Warning	WARN
Wednesday	WED
West	W
Westbound	W-BND
Will Not	WONT

Table 1A-2. Abbreviations that are Acceptable Only with a Prompt Word

Word	Abbreviation	Prompt Word
Access	ACCS	Road
Ahead	AHD	Fog*
Blocked	BLKD	Lane*
Bridge	BRDG	[Name]*
Chemical	CHEM	Spill
Condition	COND	Traffic*
Congested	CONG	Traffic*
Construction	CONST	Ahead
Downtown	DWNTN	Traffic
Exit	EX, EXT	Next*
Express	EXP	Lane
Frontage	FRNTG	Road
Hazardous	HAZ	Driving
Interstate	I	[Number]
Local	LOC	Traffic
Lower	LWR	Level
Major	MAJ	Accident
Minor	MNR	Accident
Oversized	OVRSZ	Load
Prepare	PREP	To Stop
Pavement	PVMT	Wet*
Quality	QLTY	Air*
Roadwork	RDWK	Ahead [Distance]
Route	RT, RTE	Boat*
Township	TWNSHP	Limits
Turnpike	TRNPK	[Name]*
Upper	UPR	Level

* These prompt words should precede the abbreviation

Table 1A-3. Unacceptable Abbreviations

Abbreviation	Intended Word	Common Misinterpretations
ACC	Accident	Access (Road)
CLRS	Clears	Colors
DLY	Delay	Daily
FDR	Feeder	Federal
L	Left	Lane (Merge)
LT	Light (Traffic)	Left
PARK	Parking	Park
POLL	Pollution (Index)	Poll
RED	Reduce	Red
STAD	Stadium	Standard
WRNG	Warning	Wrong

APPLICATION OF THIS GUIDELINE

Application of this guideline provides the means to meet the requirements of Section 1A.05 of the MUTCD which states:

> *"Physical maintenance of traffic control devices should be performed to retain legibility and visibility of the device, and to retain the proper functioning of the device.*
>
> *Clean, legible, properly mounted devices in good working condition command the respect of road users."*

QUALITY GUIDELINES FOR CHANNELIZING DEVICES AND SIGNS

This guideline applies to all channelizing devices and signs that are furnished by the agency, supplier, subcontractor or contractor and used for traffic control in TTC zones.

All channelizing devices and signs shall conform to the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) and the contract documents with regard to size, shape, color, placement and legend. Special signs, if required, are normally detailed in the plans. All devices required to be tested to NCHRP-Report #350 standards shall be approved by the FHWA.

Signs shall be substantially plumb to the pavement. Sign positioning at the work site should be determined based on site conditions. Usually the sign spacing may be increased if a design location proves to be unsuitable. Signs mounted on temporary mounts that are not vertical by design, (A-Frame barricade for example), should be as near vertical as practicable.

For barricades, vertical panels or drums to be used in TTC Zones, all requirements shall be met to the satisfaction of the contracting agency. Vertical panels shall be erected and maintained in a vertical position. Drums that are dented severely enough to affect their overall dimensions or contain fractures that affect their stability or ability to retain the reflective sheeting are unacceptable. Barricades shall be

considered unacceptable if they have bent or twisted legs (see photo, this page), unfinished or excessively rusty metal parts, unfinished wooden rails, or deformation of the support assembly to the extent that the barricade panel is not reasonably parallel to the roadway surface.

UNACCEPTABLE

Channelizing devices and signs should be constructed and ballasted to perform in a predictable manner when inadvertently struck by a vehicle. Channelizing devices and signs should be crashworthy. Fragments or other debris from the device or the ballast should not pose a significant hazard to road users or workers.

Any situation where there are more than two adjacent channelizing devices missing or substantially out of alignment will cause an unacceptable situation.

The evaluation guide, which follows, is to be used to evaluate the quality of the reflective face and general appearance of signs, barricades, vertical panels, drums, cones and tubular markers.

RETROREFLECTIVITY

Reserved for future final rule.

EVALUATION GUIDE FOR TEMPORARY TRAFFIC CONTROL ZONE SIGNS

ACCEPTABLE

There are several abrasions on the surface but very little loss of lettering. There has been no touch-up of the lettering. This message is legible per the design criteria of the MUTCD.

MARGINAL

Of the many surface abrasions throughout the sign face, many are within the individual letters of the message. The sign surface is free of any residue. Although some color fading is evident, the background color and reflectivity are still apparent at night. This message is legible per the design criteria of the MUTCD.

UNACCEPTABLE

Signs with asphalt splatter or cement slurry of an amount similar to the abrasions that are evident throughout the face of this sign are unacceptable. Some letters have a loss of more than fifty percent (50%). There is a noticeable color fading. The message is illegible per the design criteria of the MUTCD.

EVALUATION GUIDE FOR TYPE I, II OR III BARRICADE PANELS OR VERTICAL PANELS

ACCEPTABLE

Panel is not deformed to an extent so as to decrease the panel's target value. There are several abrasions on the surface but very little loss of reflective sheeting. The orange is vivid and the stripes provide contrast.

MARGINAL

There are numerous surface abrasions through the panel surface. Some color fading is evident; however, it is free of large areas of residue or missing reflective material. The orange is vivid and the stripes provide contrast.

UNACCEPTABLE

The surface is marred over a high percentage of the panel area. There is 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 similar in area to that shown here would also make a panel unacceptable.

EVALUATION GUIDE FOR DRUMS

ACCEPTABLE

The sheeting has only minor tears and scratches. The dent shown does not seriously reduce the reflectivity. The drum maintains its intended original shape.

MARGINAL

The sheeting has numerous tears and scratches; however, it is free of large areas of residue or missing reflective material. The large dent shown reduces the effectiveness of the upper reflective band; however, the drum strength is not reduced. The drum maintains its intended original shape.

UNACCEPTABLE

The large areas of missing reflective material on the fractured upper area make this drum unacceptable. Drums with asphalt splatter and/or cement slurry, or any combination of missing and covered reflective material would also make a drum unacceptable. Substantial deformation of a drum which reduces the original dimensions may cause the drum to be considered as "unacceptable" even if other parameters are still "acceptable".

EVALUATION GUIDE FOR CONES

ACCEPTABLE

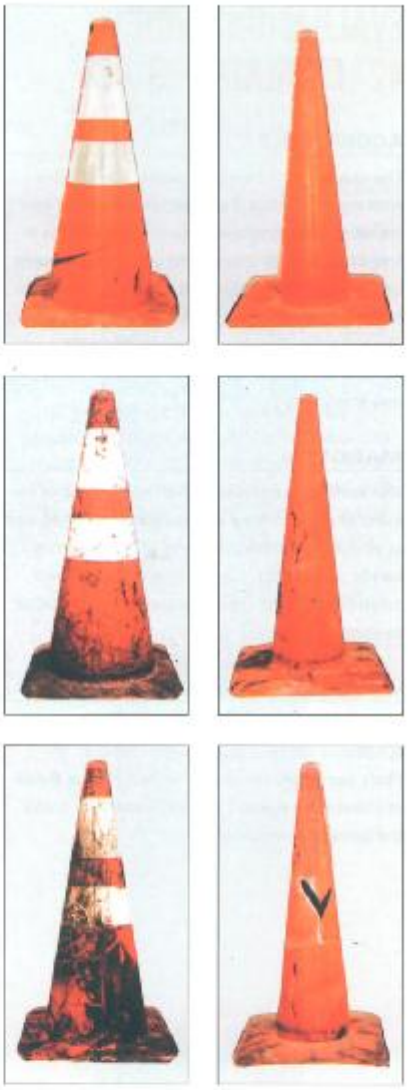
The conical shape should remain clearly identifiable with no significant distortion and must be free standing in its normal position. The surface is free of punctures and abrasions. The surface is free of asphalt splatter, cement slurry or other material and will readily respond to washing. The reflective bands, if required, have little or no loss of reflectivity, with only minor tears and scratches.

MARGINAL

The surface has some asphalt splattering or cement slurry and may not be readily cleaned due to abrasion and discoloration. The reflective bands, if required, have numerous tears and scratches, but are free of large areas of residue or missing material.

UNACCEPTABLE

Punctures and large areas of staining asphalt splatter or cement slurry make these an unlikely candidate for improvement. Large areas of missing or stained reflective material make the cone unacceptable.



EVALUATION GUIDE 42" CHANNELIZER

ACCEPTABLE

The shape should remain clearly identifiable with no significant distortion and must be free standing in its normal position. The surface is free of punctures and abrasions. The surface is free of asphalt splatter, cement slurry or other material and will readily respond to washing. The reflective bands, if required, have little or no loss of reflectivity, with only minor tears and scratches.

MARGINAL

The surface has some asphalt splattering or cement slurry and may not be readily cleaned due to abrasion and discoloration. The reflective bands, if required, have numerous tears and scratches, but are free of large areas of residue or missing material.

UNACCEPTABLE

Punctures and large areas of staining asphalt splatter or cement slurry make these an unlikely candidate for improvement. Large areas of missing or stained reflective material make the cone unacceptable.

EVALUATION GUIDE
TUBULAR MARKERS

ACCEPTABLE

The surface is free of punctures and abrasions, asphalt splatter, cement slurry, or other material and will readily respond to washing. The retroreflective bands, if required, have little or no loss of reflectivity, with only minor tears and scratches.

MARGINAL

The surface has some asphalt splattering or cement slurry and may not be readily cleaned due to abrasion or discoloration. The retroreflective bands, if required, have numerous tears and scratches, but are free of large areas of residue or missing material.

UNACCEPTABLE

Punctures and large areas of staining asphalt splatter or cement slurry make these unlikely candidates for improvement. Large areas of missing or stained retroreflective material also make the markers unacceptable.

QUALITY GUIDELINES FOR WARNING LIGHTS TYPE A, B AND C, FLASHING ARROW PANELS, ADVANCED WARNING ARROW PANELS, & PORTABLE CHANGEABLE MESSAGE SIGNS

ACCEPTABLE

This guideline applies to all warning lights, advance warning arrow panels, and portable changeable message signs that are furnished by the agency, supplier, subcontractor, or contractor and used for traffic control in TTC Zones.

The use and placement of warning lights, advance warning arrow panels, and portable changeable message signs are specified in the contract documents. All warning lights, flashing arrow panels, and portable changeable message signs shall be in accordance with the most current version of the Manual on Uniform Traffic Control Devices (MUTCD).

STANDARD: Warning lights shall be in accordance with the current ITE "Purchase Specification for Flashing and Steady-Burn Warning Lights." (Section 1A.11). When warning lights are used, they shall be mounted on signs or channelizing devices in a manner that, if hit by an errant vehicle, they will not be likely to penetrate the windshield.

Flashing warning lights shall not be used for delineation, as a series of flashers fails to identify the desired vehicle path.

Warning lights shall have a minimum mounting height of 750 mm (30 in) to the bottom of the lens.

For warning lights to be functioning properly, they must meet the MUTCD criteria which states: "Type A Low Intensity Flashing warning lights, Type C Steady-Burn warning lights, and Type D 360-degree Steady-Burn warning lights shall be maintained so as to be capable of being visible on a clear night from a distance of 900 m (3,000 feet). Type B High-Intensity Flashing warning lights shall be maintained so as to be capable of being visible on a sunny day when viewed without the sun directly on or behind the device from a distance of 300 m (1,000 feet)."

The evaluation guide that follows is to be used to evaluate the appearance and function of warning lights, advance warning arrow panels, and portable changeable message signs. Because of the different types of advance warning arrow panels approved for use, the evaluation guide will address each type (mode) of panel separately.

Any warning light, arrow panel, or portable changeable message sign that is out of alignment from the intended driver's line of vision, shall be considered to be "unacceptable".

EVALUATION GUIDE FOR WARNING LIGHTS

ACCEPTABLE One hundred percent (100%) of all warning lights must be properly operating and meeting the MUTCD specifications.

MARGINAL Not less than ninety percent (90%) of the warning lights must be properly operating and meeting the MUTCD specifications with no more than three (3) adjacent lights failing.

UNACCEPTABLE Less than ninety percent (90%) of the warning lights properly operating and meeting the MUTCD specifications, or more than three (3) adjacent lights failing, or more than one (1) Type B warning light failing for more than twelve (12) consecutive hours or as specified in the contract document.

NOTE: Any operating lamp which is out of alignment will be considered "not functioning."

EVALUATION GUIDE FOR FLASHING ARROW PANEL (FLASHING ARROW MODE OR SEQUENTIAL ARROW)

ACCEPTABLE Not more than one (1) lamp out in stem and none out in arrowhead, and dimming properly.

MARGINAL Two (2) or fewer lamps in stem out. No lamps out in the head. Dimming properly.

UNACCEPTABLE Any lamp out in the head, or more than two (2) lamps out in the stem or arrow panel not dimming properly.

EVALUATION GUIDE FOR FLASHING ARROW PANELS
(CHEVRON MODE)

ACCEPTABLE No lamps out in any chevron segment.

MARGINAL Not more than one (1) lamp out in any one chevron segment, and dimming properly.

UNACCEPTABLE Two (2) or more lamps out in any one chevron segment, or not dimming properly.

EVALUATION GUIDE FOR FLASHING ARROW PANELS
(CAUTION MODE - BAR OR CORNERS)

ACCEPTABLE Four (4) or more lamps operating and dimming properly.

MARGINAL Minimum of four (4) lamps functioning, dimming properly.

UNACCEPTABLE Less than four (4) lamps functioning or not dimming.

EVALUATION GUIDE FOR FLASHING ARROW PANELS (DOUBLE ARROW MODE)

ACCEPTABLE Not more than one (1) lamp out in stem and none out in arrow heads, and dimming properly.

MARGINAL Two (2) lamps out in stem, but both heads completely functional with no lamps out, dimming properly.

UNACCEPTABLE Any lamps in heads out or more than two (2) lamps out in the stem, or arrow panel not dimming properly.

NOTE: Any operating lamp which is out of alignment will be considered "not functioning".

EVALUATION GUIDE FOR PORTABLE CHANGEABLE MESSAGE SIGNS

ACCEPTABLE Ninety percent (90%) or more of the pixels per character module are operating properly.

MARGINAL No less than ninety percent (90%) of the pixels per character module are operating properly.

UNACCEPTABLE Less than ninety (90%) of the pixels per character module are operating properly or not performing within the criteria of the MUTCD.

QUALITY GUIDELINES FOR TEMPORARY PAVEMENT MARKINGS

The guideline applies to all temporary pavement marking furnished and/or installed by a supplier, subcontractor or contractor for traffic control in TTC zones. These markings include tape, paint, and temporary raised pavement markers.

The use and placement of pavement markings are specified in the contract documents. All markings shall be in accordance with the current version of the MUTCD.

The evaluation guide which follows is to be used to evaluate the appearance, function, and acceptability of temporary pavement markings in TTC zones.

EVALUATION GUIDE FOR TEMPORARY PAVEMENT MARKINGS (TAPE & PAINT)

ACCEPTABLE All pavement marking tape or paint required (solid lines and skip lines) is in place and meets all material specifications.

MARGINAL No more than ten percent (10%) of all tape, paint, message or symbol, or no more than two (2) consecutive skip lines, or no more than fifty (50) continuous feet of solid line is missing.

UNACCEPTABLE More than 10% of all tape, paint, message or symbol, more than two (2) consecutive skip lines, or more than fifty (50) continuous feet of solid line is missing.

EVALUATION GUIDE FOR TEMPORARY RAISED PAVEMENT MARKERS

ACCEPTABLE All temporary raised pavement markers required are in place and meet all material specifications.

MARGINAL No more than ten percent (10%) of the total raised pavement markers or no more than three (3) consecutive temporary raised pavement markers are missing.

UNACCEPTABLE More than ten percent (10%) of the total raised pavement markers or more than three consecutive temporary raised pavement markers are missing.

CRASH CUSHIONS

Protective features for end treatments of barriers, trucks and other fixed objects.

To determine when a system or compliance of a system has met the end of its useful service life please contact manufactures.

SAND/BALLAST FILLED BARRELS

Plastic Safety Systems – plasticsafety.com
Traffic Devices – traffixdevices.com
Energy Absorption – energyabsorption.com

OTHER END TREATMENTS

N.E.A.T. – Energy Absorption
QuadGuard – Energy Absorption
React 350 – Energy Absorption
Absorption 350 – Impact Absorption
TRACC – Trinity Highway Products
highwayguardrail.com
ADIEM – Trinity Highway Products

TRUCK MOUNTED ATTENUATORS

Scorpion – Traffix Devices
U Mad – Impact Absorption
impactabsorption.com
Vorteq – Energy Absorption

HIGH VISIBILITY WORK ZONE SAFETY APPAREL

High-visibility safety apparel is personal protective safety clothing that is intended to provide conspicuity (make the wearer more visible) during both daytime and nighttime usage, and that meets the Performance Class 2 or 3 requirements of American National Standards Institute (ANSI)/International Safety Equipment Association (ISEA) 107-2004. (*Federal Highway Administration worker visibility final rule.*)

All workers within the right-of-way of a Federal-aid highway who are exposed either to traffic, or to construction equipment within the work area shall wear high-visibility safety apparel. Workers affected by this requirement include, but are not limited to:

- Highway construction and maintenance crews, including flaggers
- Inspectors
- Engineering personnel
- Survey crews
- Utility crews
- Responders

WHEN SHOULD HIGH-VISIBILITY SAFETY APPAREL BE REPLACED?

High-visibility safety apparel should be replaced when it becomes faded, torn, dirty, soiled, worn, or defaced, or if it is not visible at 1,000 feet day or night. The typical useful service life of high-visibility safety apparel depends on the type of work an individual performs while wearing the apparel.

Apparel that is worn on a daily basis has a service life expectancy of approximately 6 months, although apparel that is not worn on a daily basis may have a useful service life of up to 3 years.

This material is based upon work supported by the Federal Highway Administration under grant agreement No. #DTFH61-06-G-00004.

Thank you to FHWA for granting permission to reprint.

EVALUATION GUIDE FOR HIGH VISIBILITY WORK ZONE SAFETY APPAREL

ACCEPTABLE

New high-visibility safety apparel is characterized by having vivid color contrast and high reflectivity. Apparel that is used but is in like-new condition is characterized as having excellent color contrast, excellent reflectivity, and is not faded or soiled.

MARGINAL

Good reflectivity although the vest has some soiling and light fading. Good reflectivity but has some soiling and light fading of material. *Note: The second picture was taken with a flash and simulates nighttime conditions.

UNACCEPTABLE

Little or no reflectivity, and soiled and faded material. Poor color contrast, low or no reflectivity, significant fading or soiling, and deteriorated reflective strips.

*Pictures provided by Michigan Department of Transportation and Washington Department of Transportation.

QUALITY GUIDELINES FOR TEMPORARY CONCRETE BARRIER

This standard applies to temporary concrete barrier furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

EVALUATION GUIDE FOR TEMPORARY CONCRETE BARRIER

ACCEPTABLE

These are examples of acceptable temporary barrier wall. The walls appear new with few minor blemishes. Spalls and chipped concrete are not greater than 1.5 inches in depth. The connecting loops are all sound and in place with no broken strands.

EVALUATION GUIDE FOR TEMPORARY CONCRETE BARRIER cont.

MARGINAL

These are examples of temporary barrier wall which are marginal. The walls have minor spalls with hairline cracks and minor imperfections along the base but are still structurally sound. The connecting loops are all sound and in place.

*Pictures provided by Illinois DOT.

UNACCEPTABLE

These are examples of unacceptable temporary concrete barrier walls. The barrier walls have large spalls and cracks, with unsound concrete that could be easily removed when hit. The spalled wall could cause tire damage if hit especially along the base. Any spalled concrete could cause the vehicle to "snag" and twist from the direction it is going. Any spalls greater than 1.5 inches in depth or connecting loop broken or damaged is cause for rejection.

NIGHTTIME VISIBILITY—SIGNS

Revision 2 of the 2003 Manual on Uniform Traffic Control Devices (MUTCD) was published in the Federal Register on December 21, 2007, and is effective as of January 22, 2008. The final rule provides additional requirements, guidance, clarification, and flexibility in maintaining traffic sign retroreflectivity that is already required by the MUTCD. The minimum retroreflectivity levels and maintenance methods consider changes in the composition of the vehicle population, vehicle headlamp design, and the demographics of drivers. The FHWA expects that the levels and maintenance methods will help to promote safety and mobility on the nation's streets and highways.

STANDARD: Public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3.

SUPPORT: Compliance with the above Standard is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3. Provided that an assessment or management method is being used, an agency or official having jurisdiction would be in compliance with the above Standard even if there are some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time.

GUIDANCE: Except for those signs specifically identified in the Option portion of this Section, one or more of the following assessment or management methods should be used to maintain sign retroreflectivity:

1. Visual Nighttime Inspection – The retroreflectivity of an existing sign is assessed by a trained sign inspector conducting a visual inspection from a moving vehicle during nighttime conditions. Signs that are visually identified by the inspector to have retroreflectivity below the minimum levels should be replaced.

2. Measured Sign Retroreflectivity – Retroreflectivity is measured using a retroreflectometer. Signs with retroreflectivity below the minimum levels should be replaced.

3. Expected Sign Life – When signs are installed, the installation date is labeled or recorded so that the age of a sign is known. The age of the sign is compared to the expected sign life. The expected sign life is based on the experience of sign retroreflectivity degradation in a geographic area compared to the minimum levels. Signs older than the expected life should be replaced.

4. Blanket Replacement – All signs in an area/corridor, or of a given type, should be replaced at specified intervals. This eliminates the need to assess retroreflectivity or track the life of individual signs. The replacement interval is based on the expected sign life, compared to the minimum levels, for the shortest-life material used on the affected signs.

5. Control Signs – Replacement of signs in the field is based on the performance of a sample of control signs. The control signs might be a small sample located in a maintenance yard or a sample of signs in the field. The control signs are monitored to determine the end of retroreflective life for the associated signs. All field signs represented by the control sample should be replaced before the retroreflectivity levels of the control sample reach the minimum levels.

6. Other Methods – Other methods developed based on engineering studies can be used.

Bold Symbol Signs

- W1-1, -2 – Turn and Curve
- W1-3, -4 – Reverse Turn and Curve
- W1-5 – Winding Road
- W1-6, -7 – Large Arrow
- W1-8 – Chevron
- W1-10 – Intersection in Curve
- W1-15 – 270 Degree Loop
- W2-1 – Cross Road
- W2-2, -3 – Side Road
- W2-4, -5 – T and Y Intersection
- W2-6 – Circular Intersection
- W3-1 – Stop Ahead
- W3-2 – Yield Ahead
- W3-3 – Signal Ahead
- W4-1 – Merge
- W4-2 – Lane Ends
- W4-3 – Added Lane
- W4-6 – Entering Roadway Added Lane
- W6-1, -2 – Divided Highway Begins and Ends
- W6-3 – Two-Way Traffic
- W10-1, -2, -3, -4, -11, -12 – Highway-Railroad Advance Warning
- W11-2 – Pedestrian Crossing
- W11-3 – Deer Crossing
- W11-4 – Cattle Crossing
- W11-5 – Farm Equipment
- W11-6 – Snowmobile Crossing
- W11-7 – Equestrian Crossing
- W11-8 – Fire Station
- W11-10 – Truck Crossing
- W12-1 – Double Arrow
- W16-5p, -6p, -7p – Pointing Arrow Plaques
- W20-7a – Flagger
- W21-1a – Worker

Fine Symbol Signs

Symbol signs not listed as Bold Symbol Signs.

New MUTCD Table 2A-3. Minimum Maintained Retroreflectivity Levels

Sign Color	Sheeting Type		
	Beaded Sheeting		
	I	II	III
White on Green	W*; G≥7	W*; G≥15	W*; G≥25
	W*; G≥7	W≥120; G≥15	
Black on Yellow or Black on Orange	Y*; O*	Y≥50; O≥50	
	Y*; O*	Y≥75; O≥75	
White on Red	W≥35; R≥7		
Black on White	W≥50		

1. The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m² measured at an observation angle of 0.2 ° and an entrance angle of -4.0 °.

2. For text and fine symbol signs measuring at least 1200 mm (48 inches) and for all sizes of bold symbol signs.

3. For text and fine symbol signs measuring less than 1200 mm (48 inches).

(ASTM D4956-04)	
Prismatic Sheeting	Additional Criteria
III, IV, VI, VII VIII, IX, X	
W≥250; G≥25	Overhead
W≥120; G≥15	Ground Mounted
Y≥50; O≥50	(2)
Y≥75; O≥75	(3)
W≥35; R≥7	(4)
W≥50	—

4. Minimum Sign Contrast Ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity).

* This sheeting type should not be used for this color for this application.

Special Cases

- W3-1 – Stop Ahead: Red retroreflectivity ≥ 7
- W3-2 –Yield Ahead: Red retroreflectivity ≥ 7; White retroreflectivity ≥ 35
- W3-3 – Signal Ahead: Red retroreflectivity ≥ 7; Green retroreflectivity ≥ 7
- W3-5 – Speed Reduction: White retroreflectivity ≥ 50
- For non-diamond shaped signs such W14-3 (No Passing Zone), W4-4p (Cross Traffic Does Not Stop), or W13-1, -2, -3, -5 (Speed Advisory Plaques), use largest sign dimension to determine proper minimum retroreflectivity level.

QUALITY GUIDELINES FOR TEMPORARY TRAFFIC CONTROL DEVICES

Quality Guidelines for Temporary Traffic Control Devices is a handy pocket sized handbook which illustrates various condition levels of TTC devices.

The application of these quality guidelines will help inspectors and supervisors to evaluate the condition of devices and assure continued effectiveness.

The guidelines classify traffic control devices as acceptable, marginal or unacceptable for use in work zones. Each classification is defined and color pictures and/or written descriptions are included for each type of device.

Devices included are: signs, barricades, drums, cones, tubular markers, warning lights, arrow panels, changeable message signs, pavement tape, paint and raised pavement markers.

The handbook may be ordered in any quantity from ATSSA. Use the attached order form. Allow two weeks for delivery.

Check out these Roadway Safety Training Products available from ATSSA

Supervisor's Work Zone Inspection Logbook

This 5" x 8" logbook offers the Traffic Control Supervisor the convenience and flexibility of 30 inspections in one book. Use it to inspect jobs weekly or daily depending on your internal company policy. The logbook contains a beginning summary sheet and an ending summary sheet as well as two pages for each inspection. Your records could protect the company in a legal suit.

Work Zone Visor Organizer & Safety Checklist

With adjustable straps, fits securely on all work vehicle visors. This durable organizer has 5 compartments and includes ATSSA's work zone safety checklist.

Work zone organization & safety at your finger tips!

Marketing Code: QG2006

For a complete listing of ATSSA products currently available for purchase, please visit the online store section of our website at www.atssa.com

or call 877-642-4637 to request your copy of the ATSSA Training & Products catalog.

MENTION THIS AD WHEN YOU PLACE YOUR FIRST ORDER AND RECEIVE 15% OFF CURRENT PRICING FOR EITHER PRODUCT FEATURED ABOVE.

QUALITY GUIDELINES FOR TEMPORARY TRAFFIC CONTROL DEVICES PRICE LIST

Quantity	ATSSA Members & Public Agencies	Non Members
1	$5.95	$7.95
50+	$3.95	$5.95

Prices subject to change without notice

Please send: _____ copies @ $ _____

+ $ _____ (tax*) + $ _____ (shipping**) = $ _____

Name: _____

Title: _____

Agency/Company: _____

Street Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Fax: _____

❑ Check enclosed

❑ Please charge to my credit card

❑ VISA ❑ Mastercard ❑ American Express ❑ Discover

Card Number: _____

Exp. Date: _____

Authorized signature: _____

❑ Copy of signed purchase order enclosed (public agencies only) Marketing Code: QG2006

*SALES TAX: We are required by law to collect the appropriate tax on product orders shipped to these locations: Virginia 5%, Washington state 6.5%, Canada 7% and the appropriate state and district tax in California.

**SHIPPING POLICY: Orders are shipped UPS Ground unless otherwise requested. All UPS Ground, Next Day Air, 2nd Day Air and 3 Day shipment rates are throughout the contiguous 48 states. No COD shipments will be accepted at any time. Same Day "Rush" orders will incur a $20 surcharge. Orders processed using your shipping account incur a $10 surcharge.

UPS SHIPPING CHARGES

ORDER TOTAL	GROUND	3 DAY	2 DAY	NEXT DAY
$1-9.99	$5.50	$8.50	$10.00	$17.00
$10-24.99	$6.50	$11.00	$14.50	$22.00
$25-49.99	$7.50	$14.00	$18.00	$28.00
$50-74.99	$9.50	$15.00	$22.00	$40.00
$75-99.99	$11.00	$20.00	$26.00	$50.00
$100-199	$14.00	$26.00	$36.00	$65.00
$200-299	$18.50	$33.00	$49.00	$77.00
$300-399	$20.50	$41.00	$61.00	$89.00
$400-499	$25.00	$49.50	$73.00	$109.00
$500-599	$30.50	$57.50	$85.50	$125.00
$600-699	$35.00	$69.50	$95.50	$152.00
$700-799	$35.00	$75.00	$106.50	$169.00
$800-899	$38.00	$82.00	$117.00	$166.00
$900-999	$41.50	$91.00	$130.00	$187.00