

Product Information Report

Fleet Lighting



Overview

Federal Lighting Regulations

Lighting and reflectors are an essential and required component for all fleet vehicles, commercial trailers and personal trailers.

The following tables that list the lighting equipment requirements for all vehicles and trailers. These tables summarize the standards set forth by FMVSS/CMVSS 108. Following the tables are drawings which are labeled with the locations and required types of illumination equipment.

IMPORTANT NOTE: Every lamp, reflex reflector and conspicuity treatment must be permanently attached in the location specified below and must comply with all applicable requirements prescribed for it by FMVSS/CMVSS 108. The face of any device on the front/rear and sides should be, respectively, perpendicular and parallel to the vehicle's centerline, unless it is photometrically certified at an installation angle. No part of the vehicle shall prevent any device from meeting its prescribed requirements unless an auxiliary device meeting all prescribed requirements is installed.

IN CANADA: Manufacturers and importers of vehicles must have the proper certification test records demonstrating compliance of lighting components with all prescribed requirements.

Basic Equipment Required on All Trailers

Description				Mandatory Requirements			
Area	Equipment	SAE Lens Coding	Function	Quantity	Color	Location	Height from the ground
1	Tail Lamps	(T)	Indicate vehicle presence and width	Minimum 2	Red	On the rear – symmetrical – as far apart as practicable	380mm – 1,830mm (15" – 72")
	Stop Lamps	(S)	Indicate braking	Minimum 2	Red	On the rear – symmetrical – as far apart as practicable	380mm – 1,830mm (15" – 72")
	Rear Turn Signal Lamps	(I)	Indicate direction of turn	Minimum 2	Red or Yellow	On the rear – symmetrical – as far apart as practicable	380mm – 2,110mm (15" – 83")
	Rear Reflex Reflectors	(A)	Indicate vehicle presence and width	Minimum 2	Red	On the rear – symmetrical – as far apart as practicable, facing rearward	380mm – 1,530mm (15" – 60")
2	License Plate Lamp(s)	(L)	Illuminates license plate	Minimum 1	White	On the rear – above or at the sides of license plate	No Requirement
3	Rear Side Marker Lamps	(P2, PC* or P3, PC2*)	Indicate vehicle presence and length	Minimum 2	Red	Each side at rear – as far back as practicable	380mm – 1,530mm (15" – 60"); no max. for vehicle under 2,032mm (80") wide
	Rear Side Reflex Reflectors	(A)		Minimum 2	Red	Each side at rear – as far back as practicable, facing sideward	380mm – 1,530mm (15" – 60")
4a	Front Side Marker Lamps	(P2, PC* or P3, PC2*)	Indicate vehicle presence and length	Minimum 2	Yellow	Each side at front – as far forward as practicable	380mm (15") minimum
4b	Front Side Reflex Reflectors	(A)	Indicate vehicle presence and length	Minimum 2	Yellow	Each side at front – as far forward as practicable, facing sideward	380mm – 1,530mm (15" – 60")

*Photometrically certified at installation angle

Additional Equipment for Trailers Exceeding the Following Parameters

Length 9.1m (30 ft.) or Longer

Description				Mandatory Requirements			
Area	Equipment	SAE Lens Coding	Function	Quantity	Color	Location	Height from the ground
5a	Intermediate Side Marker Lamps	(P2 or P3)	Indicate presence of a long vehicle	Minimum 2	Yellow	Each side near center – facing sideward	380mm (15") minimum
5b	Intermediate Side Reflex Reflectors	(A)	Indicate presence of a long vehicle	Minimum 2	Yellow	Each side near center – facing sideward	380mm – 1,530mm (15" – 60")

Width 2,032mm (80 in.) or Wider

Description				Mandatory Requirements			
Area	Equipment	SAE Lens Coding	Function	Quantity	Color	Location	Height from the ground
6	Rear Clearance Lamps	(P2, PC* or P3, PC2*)	Show vehicle's width – MAY NOT be combined with tail lamps	Minimum 2	Red	At widest point – symmetrical – on the rear or near the rear, facing rearward	As high as practicable; may be lower only if ID lamps are at the top
7	Rear Identification (ID) Lamps	(P2 or P3)	Indicate presence of a wide vehicle	Exactly 3	Red	On the rear – center horizontally – spaced 150mm to 300mm (6" to 12") apart, facing rearward	In Canada – At the top – may be lower if door header narrower than 25mm In U.S.A. – As high as practicable
8	Front Clearance Lamps	(P2, PC* or P3, PC2*)	Show vehicle's width	Minimum 2	Yellow	At widest point – symmetrical – on the front or near the front, facing forward	As high as practicable

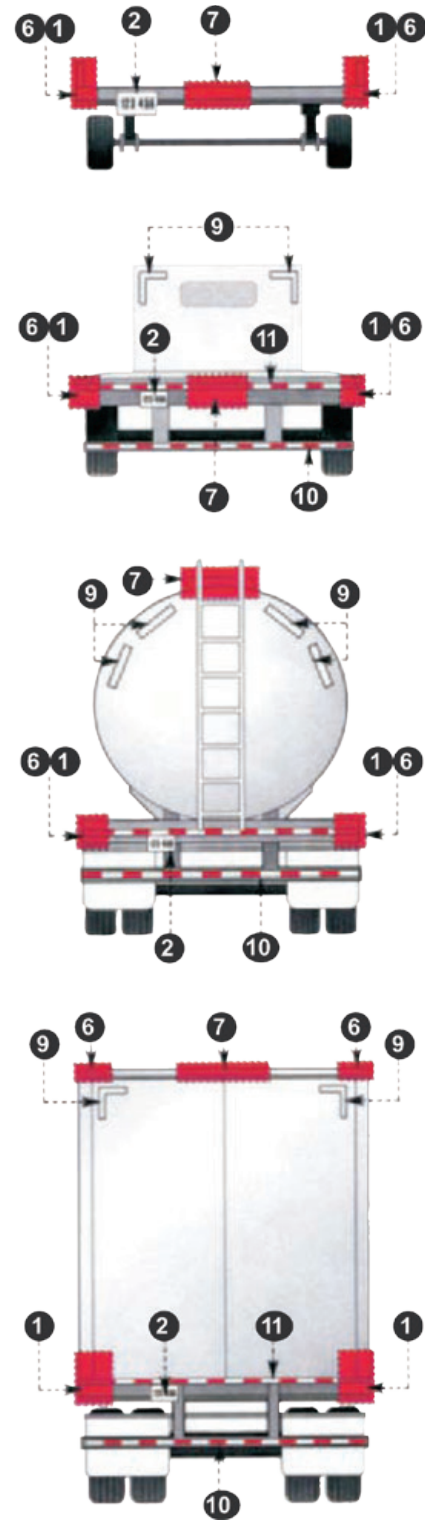
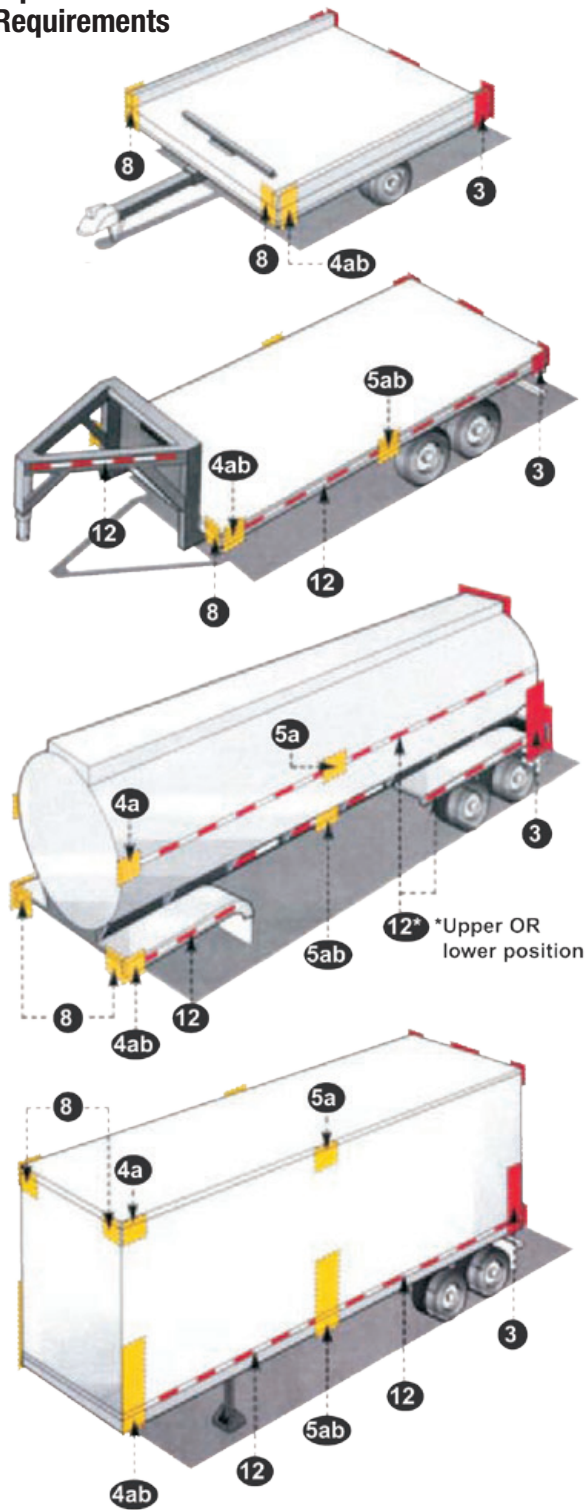
*Photometrically certified at installation angle

Width 2,032mm (80 in.) or Wider And GVWR 4,536kg (10,000 lb.) or Heavier

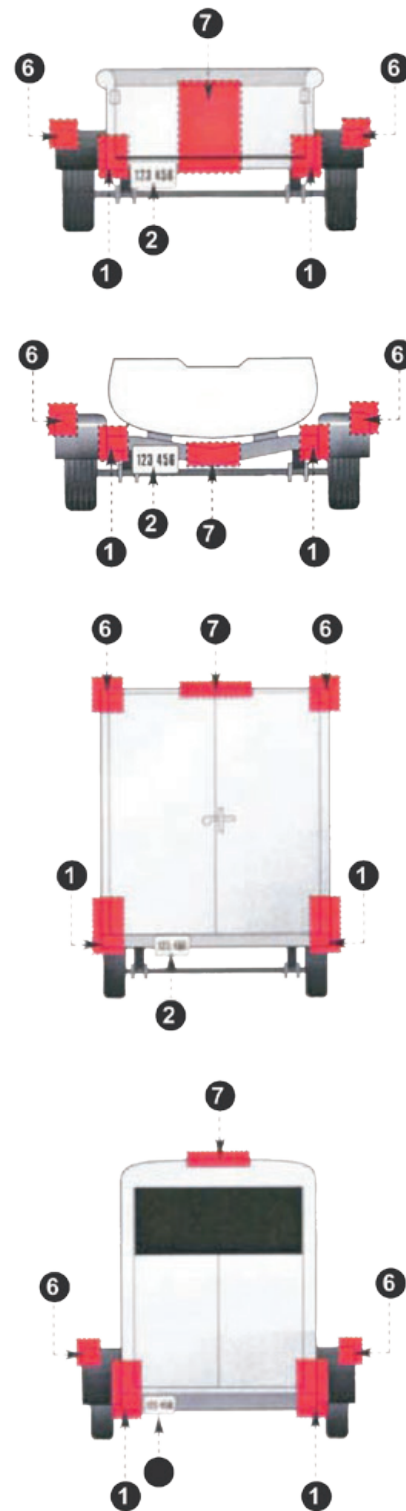
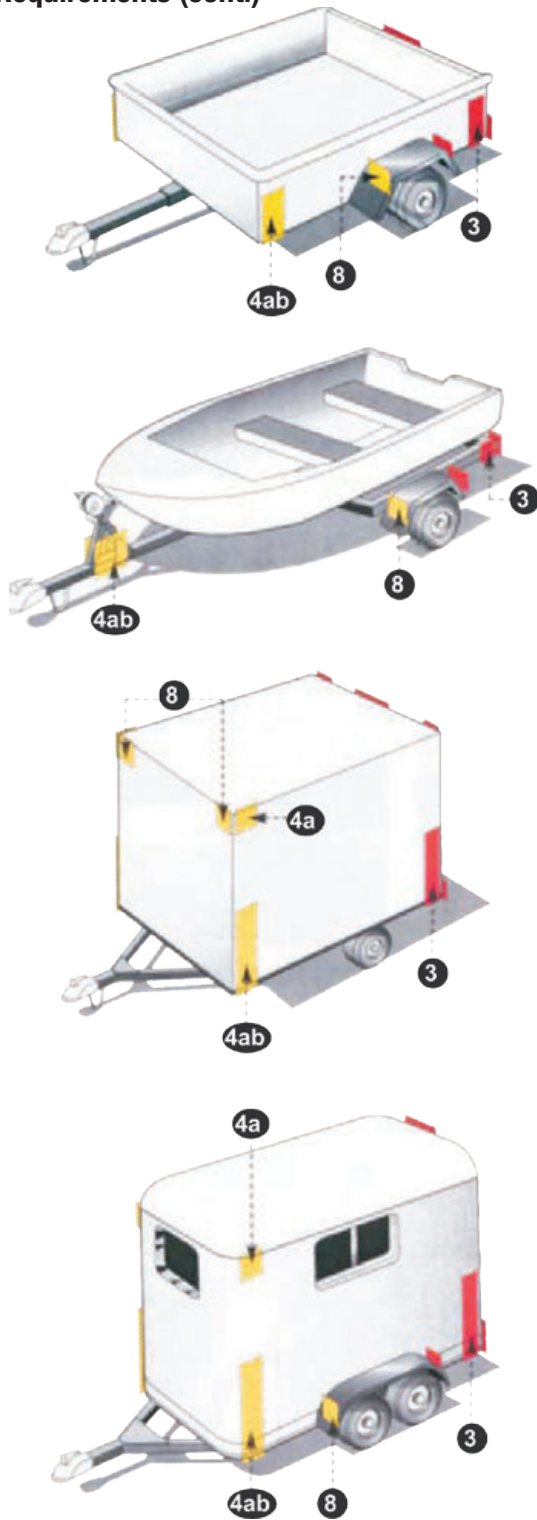
Description			Mandatory Requirements				
Area	Conspicuity Treatment	DOT Coding	Quantity	Color	Location	Height	Options
9	Rear Upper Body Marking	DOT-C DOT-C2 DOT-C3 DOT-C4	Exactly 2 pairs of 300mm long strips	White	On the rear upper corners facing rearward	At the top	Reflex reflectors may not be required if they are replaced in their required location with conspicuity treatment.
10	Bumper Bar Marking		Continuous	Red/White	On the rear bumper bar's horizontal element, full width – facing rearward	No requirement	
11	Rear Lower Body Marking		Continuous	Red/White (See Options)	On the rear, full width of the vehicle facing rearward	As horizontal as practicable and as close as practicable to the range of 375mm to 1,525mm from the ground	
12	Side Marking		(See Location)	Red/White (See Options)	Each side – facing sideward – continuous, or evenly spaced over minimum of 50% of length – starts and ends as close to the front and rear of the vehicle as practicable		OPTIONAL IN CANADA: Rear lower body and side conspicuity treatment may also be solid white, solid yellow, or white and yellow.

NOTE: The edge of red conspicuity tape shall not be closer than 75mm to the edge of any amber lamp, and the edge of white conspicuity tape shall not be closer than 75mm to the edge of any lamp.

Trailer Equipment Location Requirements



Trailer Equipment Location Requirements (cont.)



Basic Equipment Required on all Trucks, Buses and MPVs

Description				Mandatory Requirements			
Area	Equipment	SAE Lens Coding	Function	Quantity	Color	Location	Height from the ground
1	Headlamps – Lower Beam U.S. requires “DOT” lettering on lens U.S. and Canada – light source code required on lens	(H, HR)	Forward road illumination	Minimum 2	White	On the front – symmetrical – as far apart as practicable If 4-lamp system – outboard or above upper beams	560mm – 1,370mm (22" – 54")
	Headlamps – Upper Beam U.S. requires “DOT” lettering on lens U.S. and Canada – light source code required on lens	(H, HR)	Forward road illumination	Minimum 2	White	On the front – symmetrical If 4-lamp system – inboard or below lower beams	560mm – 1,370mm (22" – 54")
	Parking Lamps Vehicles less than 2,032mm wide	(P)	Indicate parked vehicle	Minimum 2	White or Yellow	On the front – symmetrical – as far apart as practicable	380mm – 1,530mm (15" – 60")
	Daytime Running Lamps (DRL) Canada – required U.S. – option U.S. requires “DRL” lettering on lens if not headlamp	(Y2)	Indicate in-use vehicle	Minimum 2	White or Yellow	On the front – symmetrical – as far apart as practicable	380mm (15") minimum; maximum depends on type of DRL
	Front Turn Signal/ Hazard Warning Lamps	(I)	Indicate direction of turn; identify disabled vehicle	Minimum 2	Yellow	On the front – symmetrical – as far apart as practicable	380mm – 2,110mm (15" – 83")
2	Front Clearance Lamps Vehicles 2,032mm wide or wider	(P2, PC* or P3, PC2*)	Show vehicle's width	Minimum 2	Yellow	At widest point – symmetrical – on the front or near the front facing forward	As high as practicable
3	Front Identification Lamps (ID) Vehicles 2,032mm wide or wider	(P2 or P3)	Indicate presence of a wide vehicle	Exactly 3	Yellow	On the front – center – horizontally spaced 150mm to 300mm (6" to 12") apart	As high as practicable or on top of the cab
4a	Front Side Marker Lamps	(P2, PC* or P3, PC2*)	Indicate vehicle's presence and length	Minimum 2	Yellow	Each side at front as far forward as practicable	380mm (15") minimum
4b	Front Side Reflex Reflectors	(A)	Indicate vehicle's presence and length	Minimum 2	Yellow	Each side at front as far forward as practicable facing sideward	380mm – 1,530mm (15" – 60")

**Photometrically certified at installation angle*

IMPORTANT NOTE: Every lamp, reflex reflector and conspicuity treatment must be permanently attached in the location specified below and must comply with all applicable requirements prescribed for it by FMVSS/CMVSS 108. The face of any device on the front/rear and sides should be, respectively, perpendicular and parallel to the vehicle's centerline, unless it is photometrically certified at an installation angle. No part of the vehicle shall prevent any device from meeting its prescribed requirements unless an auxiliary device meeting all prescribed requirements is installed.

IN CANADA: Manufacturers and importers of vehicles must have the proper certification test records demonstrating compliance of lighting components with all prescribed requirements.

Basic Equipment Required on all Trucks, Buses and MPVs (cont.)

Description				Mandatory Requirements			
Area	Equipment	SAE Lens Coding	Function	Quantity	Color	Location	Height from the ground
5a	Rear Side Marker Lamps**	(P2, PC* or P3, PC2*)	Indicate vehicle's presence and length	Minimum 2	Red	Each side at rear – as far back as practicable	380mm (15") minimum
5b	Rear Side Reflex Reflectors**	(A)	Indicate vehicle's presence and length	Minimum 2	Red	Each side at rear – as far back as practicable facing sideward	380mm – 1,530mm (15" – 60")
6	Rear Clearance Lamps** Vehicles 2,032mm wide or wider	(P2, PC* or P3, PC2*)	Show vehicle's width; MAY NOT be combined with tail lamps	Minimum 2	Red	At widest point – symmetrical – on the rear or near the rear facing rearward	As high as practicable; may be lower only if rear ID lamps are at top
7	Rear Identification (ID) Lamps** Vehicles 2,032mm wide or wider	(P2 or P3)	Indicate presence of a wide vehicle	Exactly 3	Red	On the rear – center – horizontally spaced 150mm to 300mm (6" to 12") apart facing rearward	In Canada – At the top – may be lower if door header narrower than 25mm In U.S.A. – As high as practicable
8	Tail Lamps	(T)	Indicate vehicle presence and width	Minimum 2	Red	On the rear – symmetrical – as far apart as practicable	380mm – 1,830mm (15" – 72")
	Stop Lamps	(S)	Indicate braking	Minimum 2	Red	On the rear – symmetrical – as far apart as practicable	380mm – 1,830mm (15" – 72")
	Rear Turn Signal/ Hazard Warning Lamps	(I)	Indicate direction of turn; identify disabled vehicle	Minimum 2	Red or Yellow	On the rear – symmetrical – as far apart as practicable	380mm – 2,110mm (15" – 83")
	Rear Reflex Reflectors	(A)	Show vehicle presence and width	Minimum 2	Red	On the rear – symmetrical – as far apart as practicable facing rearward	380mm – 1,530mm (15" – 60")
9	Backup Lamp	(R)	Illuminate ground behind the vehicle and alert road users	Minimum 1	White	Rear	No requirement
10	License Plate Lamp(s)	(L)	Illuminate license plate	Minimum 1	White	On the rear – above or at the sides of license plate	No requirement
11	Center High Mounted Stop Lamp Vehicles less than 2,032mm wide and 4,536kg	(U3)	Indicate braking	1	Red	On the rear – centerline of the vehicle	860mm (34") minimum

*Photometrically certified at installation angle

**Not required on truck tractors

Additional Equipment For Specific Vehicles

Length 9.1m (30 ft.) or Longer

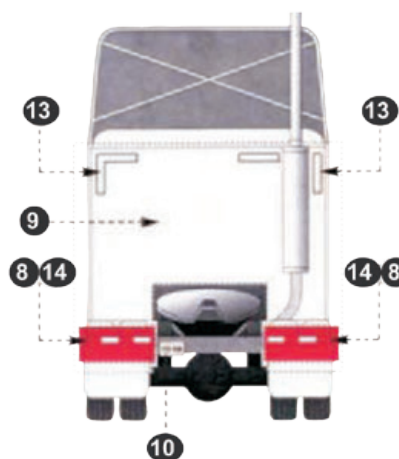
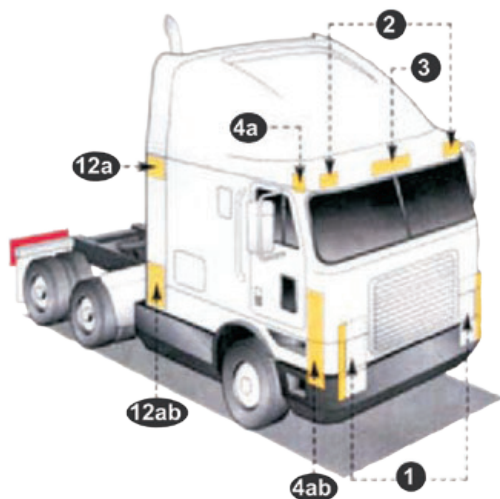
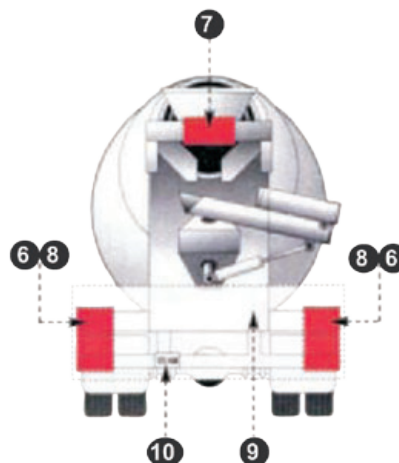
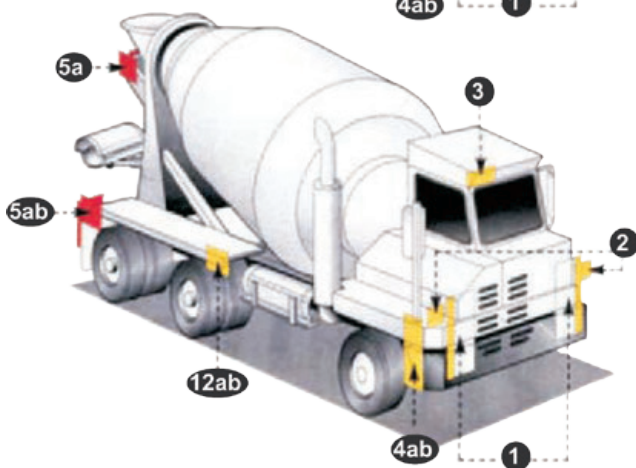
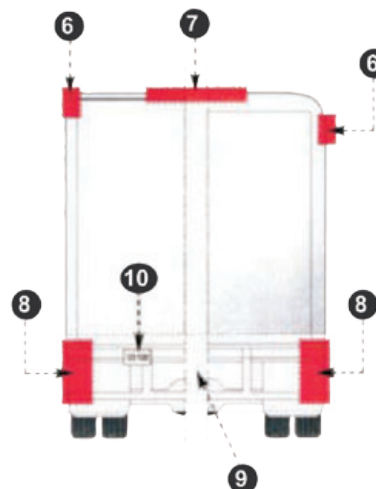
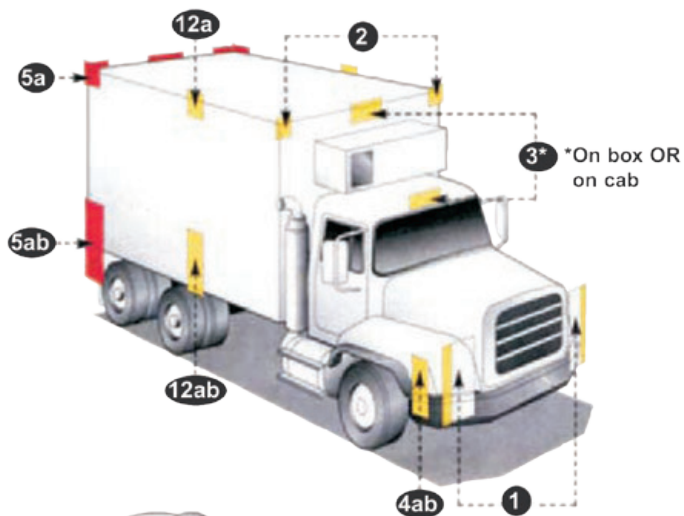
Description				Mandatory Requirements			
Area	Equipment	SAE Lens Coding	Function	Quantity	Color	Location	Height from the ground
12a	Intermediate Side Marker Lamps	(P2 or P3)	Indicate presence of a long vehicle	Minimum 2	Yellow	Each side near center	380mm (15") minimum
12b	Intermediate Side Reflex Reflectors	(A)	Indicate presence of a long vehicle	Minimum 2	Yellow	Each side near center – facing sideward	380mm – 1,530mm (15" – 60")

Truck Tractors

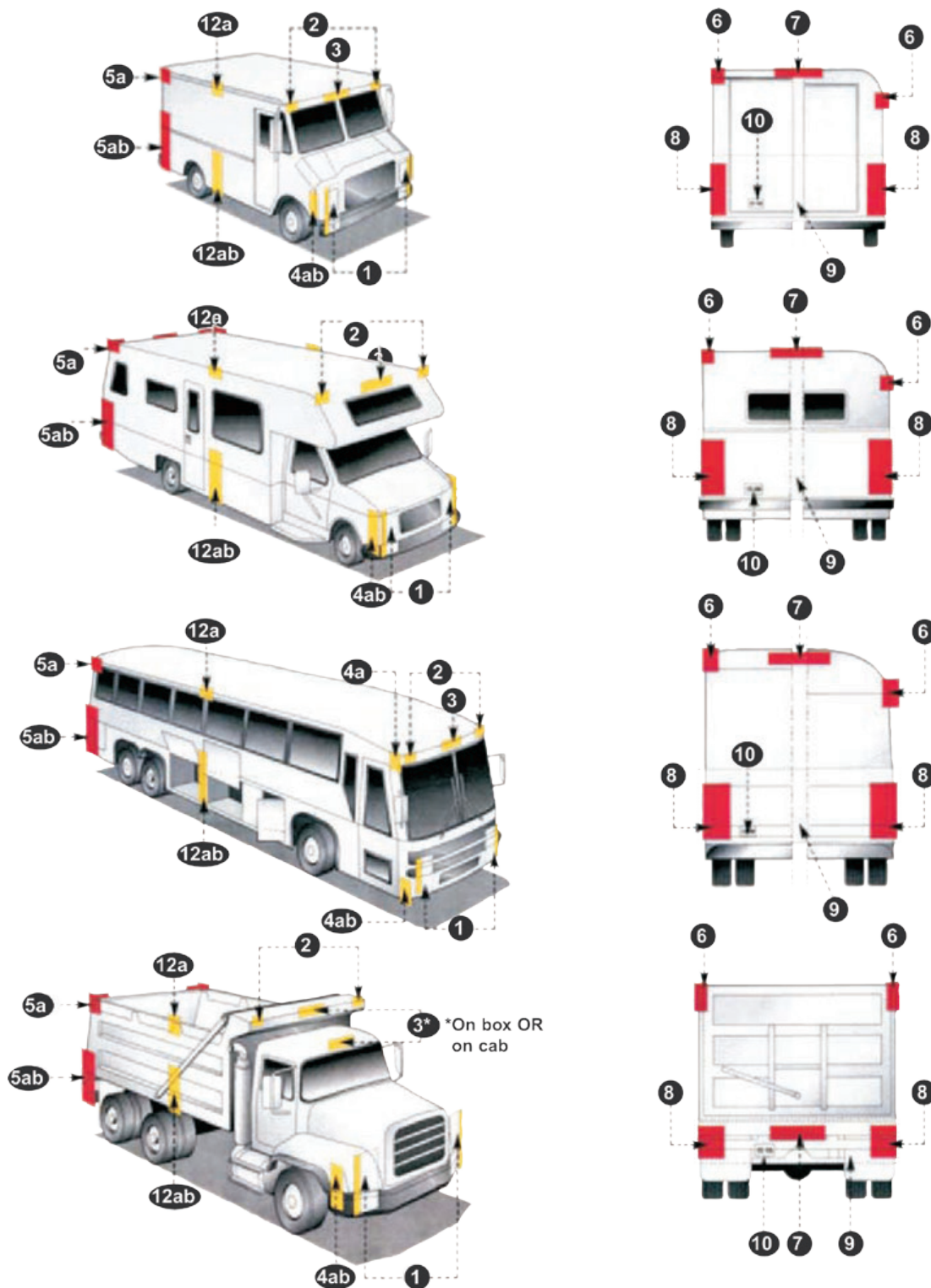
Description			Mandatory Requirements				
Area	Conspicuity Treatment	DOT Coding	Quantity	Color	Location	Height	Options
13	Rear Upper Body Marking	DOT-C DOT-C2 DOT-C3 DOT-C4	Exactly 2 pairs of 300mm long strips	White	Rear upper corners of cab facing rearward	As high as practicable excluding fairings	–
14	Rear Markings		Exactly 2 sections of min. 600mm each	Red/White	Rear – facing rearward – on fenders, mud flap brackets, or within 300mm below the top of mud flaps	As horizontal as practicable, and not higher than 1,525mm from the ground	If mud flaps not used – on the cab or frame-mounted brackets

NOTE: The edge of red conspicuity tape shall not be closer than 75mm to the edge of any amber lamp, and the edge of white conspicuity tape shall not be closer than 75mm to the edge of any lamp.

Truck, Bus and MPV Equipment Location Requirements



Truck, Bus and MPV Equipment
Location Requirements (cont.)



SAE Device Codes (Letters Indicating Device Functions)

A	Reflex reflector
C	Motorcycle auxiliary front lamps
D	Motorcycle and motor-driven cycle turn signal lamps
E	Side turn signal lamps – vehicles 9.1m or more in length
E2	Side turn signal lamps – vehicles less than 9.1m in length
F	Front fog lamps
G	Truck cargo lamp
H	Sealed beam headlamp
HH	Sealed beam headlamp housing
HR	Replacement bulb headlamp
I	Turn signal lamps
I3	Turn signal lamps spaced from 75mm to less than 100mm from headlamp
I4	Turn signal lamps spaced from 60mm to less than 75mm from headlamp
I5	Turn signal lamps spaced less than 60mm from headlamp
I6	Truck turn signal lamps spaced from 75mm to less than 100mm from headlamp
I7	Truck turn signal lamps spaced from 60mm to less than 75mm from headlamp
I8	Truck turn signal lamps spaced less than 60mm from headlamp
J590	Turn signal flasher
J945	Hazard warning signal flasher
J1054	Warning lamp alternating flasher
J1318	Strobe warning lamps
K	Front cornering lamps
K2	Rear cornering lamps
L	License plate lamps
M	Motorcycle and motor-driven cycle headlamps – motorcycle type
N	Motorcycle and motor-driven cycle headlamps – motor-driven cycle type

O	Spot lamps
P	Parking lamps
P2	Clearance or side marker or identification lamps
PC	Combination clearance and side marker lamps
Q	Turn signal operating units – Class A
QB	Turn signal operating units – Class B
QC	Vehicular hazard warning signal operating unit
R	Backup lamps
S	Stop lamps
S2	Truck stop lamps
T	Tail lamps
U	Supplemental high-mounted stop and turn signal lamps
U2	Supplemental center high-mounted stop lamp for trucks
U3	Center high-mounted stop lamp for passenger vehicles
W	Warning lamps for emergency, maintenance and service vehicles
W2	Warning lamps for school buses
W3	360° emergency warning lamps
W4	Emergency warning device
W5-1	360° gaseous discharge lamp – Class 1
W5-2	360° gaseous discharge lamp – Class 2
W5-3	360° gaseous discharge lamp – Class 3
Y	Driving lamps
Z	Auxiliary low beam lamps

Tips to Prolong Equipment Lighting Life



Lighting products generate heat! Care should be taken to avoid contact with flammable materials.

- Never use a test probe to pierce wire insulation when troubleshooting lighting complaints. Wicking action takes place which causes moisture to travel along the wire strands and corrode critical connections. If probing a harness or wire is necessary, make sure the puncture is properly sealed.
- To correct voltage problems, discover the real cause. Under-voltage is often caused by poor electrical connections. To correct under-voltage, don't just turn up the voltage – find out what caused the under-voltage problem.
- Many discarded lamps are still in good condition. Play detective when solving lamp problems. First, test with either a meter, power supply or battery. Then, if you desire, open the lens on a discarded lamp and examine the bulb. It will tell you why it failed. For example:
 - A bulb with stretched or broken filaments was subjected to vibration.
 - A yellowish, whitish or bluish glaze on the bulb indicates a rupture in the bulb glass envelope.
 - A dark metallic finish indicates old age.
 - A black, sooty bulb indicates a poor seal in the bulb. Test all lamps one more time before you discard them. Truck-Lite's warranty department reports that up to 20% of all lamps sent back are still in good operating condition. The ones that aren't working can be turned over to your lamp supplier.
- All lamps will last longer if they run cool. Dirt on the lens increases the heat, so keep them as clean as possible. Other people can see your rig, and that is one of the purposes of the lighting system – to be seen. Certain lighting products generate heat. Care should be taken to avoid contact with flammable materials.
- Treat the electrical system as you would the chassis. Lubricate sockets, pigtails, battery terminals and connections with a nonconductive anti-corrosion compound. The purpose of the sealant is to totally encapsulate and protect against corrosion and water.
- Inspect for improper ground connections. This is a major cause of lamp failure, especially when the trailer is used for a ground. When lamps are grounded through the lamp housing, make sure there is a clean connection (i.e., metal-to-metal). Also, a fifth wheel ground strap may be used for added protection on the chassis ground system.
- Look for loose, bare or unsupported wire on fixtures. Harnesses and wiring should be on the underside of top frame members rather than on the bottom where dirt and road splash collect.
- Always replace wiring, trailer light cables and harnesses with an equal or heavier gauge of wire than was used in the original specifications. If you don't, you may cause unnecessary problems.
- On older trucks, you should never crank the truck when any lights or accessories are on. Never leave markers and hazard lights on when parked against a dock. Melted lenses are a sure sign that the vehicle has been parked against the dock while the lights were on.
- Inspect the grommets that house the lamps. As they age, they will eventually deteriorate from sunlight, ozone and harmful chemicals. New grommets restore shock protection, security and improve appearance.

**Tips to Prolong
Equipment Lighting Life
(cont.)**

Cleaning Materials

The use of solvents which are not compatible with polycarbonate will result in the softening, crazing, and cracking of the plastic part. This is especially true of polycarbonate lamps and mounting bases which may be under stress in their normal applications.

**The following solvents/cleaners are
COMPATIBLE with polycarbonate:**

- Mild soap and water
- Mineral spirits
- Hexane
- VM & P Naphtha
- Varsol No. 2
- #1 and #3 denatured alcohol
- Freone TF and TE-35
- Ethanol
- 10% Solution Bon Ami®
- Dirtex®
- 2% Solution Regular Joy®
- Heptane
- White kerosene
- Methyl, isopropyl and isobutyl alcohols
- Lacryl® PCL-2035 polycarbonate cleaner
- Petroleum ether/65°C boiling point

**The following solvents/cleaners MUST
NOT BE USED with polycarbonate:**

- Trichlor
- Acetone
- Triclene®
- Methyl ethyl ketone (MEK)
- MIBK
- Toluol
- Benzol
- Gasoline
- Carbon tetrachloride
- Chlorinated hydrocarbons
- Texize – 8006, 8129, 8758
- Liquid Cleaner – 8211
- Agitene®
- Ajax®
- All liquid detergents
- Pink Lux® (phosphate free)
- Diversol®
- Lemon Joy® (phosphate free)
- Kleenol Plastics
- Lestoil®
- Lysol®
- Stanisol Naphtha®
- Oils