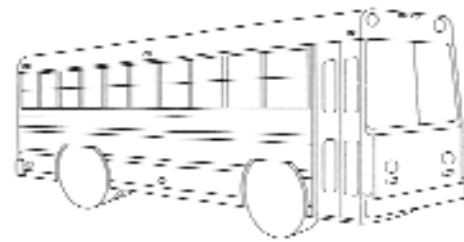
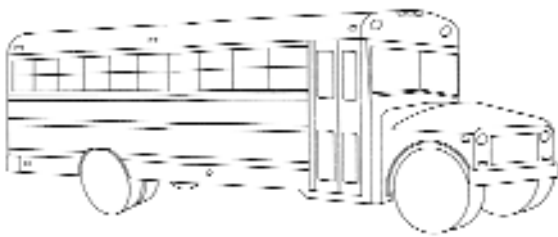


SBMTC
School Bus
Technical Reference



Prepared by the
School Bus Manufacturers
Technical Council



**National Association of State Directors of
Pupil Transportation Services**

August 2001

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Section I

Federal Motor Vehicle Safety Standards Applicable To School Buses

REQUIREMENTS APPLY TO SCHOOL BUSES HAVING A GVWR

Federal Standard Number, Title and Description	10,000 Pounds & Under Type A 1 & B 1	Over 10,000 Pounds Type A 2 & B 2	Over 10,000 Pounds Type C	Over 10,000 Pounds Type D
FMVSS No. 101 Controls and Displays This standard specifies requirements for the location, identification and illumination of motor vehicle controls and displays.	X	X	X	X
FMVSS No. 102 Transmission Shift Lever Sequence, Starter Interlock and Transmission Braking Effect This standard specifies the requirements for the transmission shift lever sequence, a starter interlock, and for a braking effect of automatic transmissions.	X	X	X	X
FMVSS No. 103 Windshield Defrosting and Defogging Systems This standard specifies requirements for windshield defrosting and defogging systems.	X	X	X	X
FMVSS No. 104 Windshield Wiping and Washing Systems This standard specifies requirements for windshield wiping and washing systems.	X	X	X	X
FMVSS No. 105 Hydraulic Brake Systems This standard specifies requirements for hydraulic service brake and associated parking brake systems, including antilock brake systems.	X	X	X	X
FMVSS No. 106 Brake Hoses This standard specifies labeling and performance requirements for motor vehicle brake hose, brake hose assemblies and brake hose end fittings.	X	X	X	X
FMVSS No. 108 Lamps, Reflective Devices and Associated Equipment This standard specifies requirements for original and replacement lamps, reflective devices and associated equipment.	X	X	X	X
FMVSS No. 111 Rearview Mirrors This standard specifies requirements for the performance and location of inside and outside rearview mirrors.	X	X	X	X

Section I (continued)

Federal Motor Vehicle Safety Standards Applicable To School Buses

REQUIREMENTS APPLY TO SCHOOL BUSES HAVING A GVWR

Federal Standard Number, Title and Description	10,000 Pounds & Under Type A 1 & B 1	Over 10,000 Pounds Type A 2 & B 2	Over 10,000 Pounds Type C	Over 10,000 Pounds Type D
FMVSS No. 113 Hood Latch System This standard establishes the requirement for providing a hood latch system or hood latch systems.	X	X	X	X
FMVSS No. 116 Motor Vehicle Brake Fluids This standard specifies requirements for fluids for use in hydraulic brake systems of motor vehicles, containers for these fluids and labeling of the containers.	X	X	X	X
FMVSS No. 119 New Pneumatic Tires for Vehicles Other Than Passenger Cars This standard establishes performance and marking requirements for tires.	X	X	X	X
FMVSS No. 120 Tire Selection and Rims for Motor Vehicles Other Than Passenger Cars This standard specifies tire and rim selection requirements and rim marking requirements.	X	X	X	X
FMVSS No. 121 Air Brake Systems This standard establishes performance and equipment requirements for braking systems on vehicles equipped with air brake systems and antilock brake systems.	X	X	X	X
FMVSS No. 124 Accelerator Control Systems This standard establishes requirements for the return of a vehicle's throttle to the idle position when the driver removes the actuating force from the accelerator control, or in the event of a severance or disconnection in the accelerator control system.	X	X	X	X
FMVSS No. 131 School Bus Pedestrian Safety Devices This standard establishes requirements for devices that can be installed on school buses to improve the safety of pedestrians in the vicinity of stopped school buses.	X	X	X	X
FMVSS No. 201 Occupant Protection In Interior Impact This standard specifies requirements to afford impact protection for occupants.	X			

Section I (continued)

Federal Motor Vehicle Safety Standards Applicable To School Buses

REQUIREMENTS APPLY TO SCHOOL BUSES HAVING A GVWR

Federal Standard Number, Title and Description	10,000 Pounds & Under Type A 1 & B 1	Over 10,000 Pounds Type A 2 & B 2	Over 10,000 Pounds Type C	Over 10,000 Pounds Type D
FMVSS No. 202 Head Restraints (Driver's Seat) This standard specifies requirements for head restraints.	X			
FMVSS No. 203 Impact Protection for the Driver from the Steering Control System This standard specifies requirements for steering control systems.	X			
FMVSS No. 204 Steering Control Rearward Displacement This standard specifies requirements limiting the rearward displacement of the steering control in to the passenger compartment.	X			
FMVSS No. 205 Glazing Materials This standard specifies requirements for glazing materials for use in motor vehicles and items of motor vehicle equipment.	X	X	X	X
FMVSS No. 207 Seating Systems (Driver's Seat) This standard establishes requirements for seats, their attachment assemblies and their installation.	X	X	X	X
FMVSS No. 208 Occupant Crash Protection (Driver) This standard specifies performance requirements for the protection of vehicle occupants in crashes.	X	X	X	X
FMVSS No. 209 Seat Belt Assemblies This standard specifies requirements for seat belt assemblies.				
Driver's Seat	X	X	X	X
Passenger Seat	X			
FMVSS No. 210 Seat Belt Assembly Anchorages This standard establishes requirements for seat belt assembly anchorages.				
Driver's Seat	X	X	X	X
Passenger Seat	X			

Section I (continued)

Federal Motor Vehicle Safety Standards Applicable To School Buses

REQUIREMENTS APPLY TO SCHOOL BUSES HAVING A GVWR

Federal Standard Number, Title and Description	10,000 Pounds & Under Type A 1 & B 1	Over 10,000 Pounds Type A 2 & B 2	Over 10,000 Pounds Type C	Over 10,000 Pounds Type D
FMVSS No. 212 Windshield Mounting This standard establishes windshield retention requirements for motor vehicles during crashes.	X			
FMVSS No. 213 Child Restraint Systems This standard specifies requirements for child restraint systems used in motor vehicles, including integral child safety seats.	X	X	X	X
FMVSS No. 214 Side Impact Protection This standard specifies performance requirements for protection of occupants in side impact crashes.	X			
FMVSS No. 217 Bus Emergency Exits and Window Retention and Release This standard establishes requirements for the retention of windows other than windshields in buses, and establishes operating forces, opening dimensions and markings for push-out bus windows and other emergency exits.	X	X	X	X
FMVSS No. 219 Windshield Zone Intrusion This standard specifies limits for the displacement of motor vehicle components into the windshield area during a crash.	X			
FMVSS No. 220 School Bus Rollover Protection This standard establishes performance requirements for school bus rollover protection.	X	X	X	X
FMVSS No. 221 School Bus Body Joint Strength This standard establishes requirements for the strength of the body panel joints in school bus bodies.	X	X	X	X
FMVSS No. 222 School Bus Passenger Seating and Crash Protection. This standard establishes occupant protection requirements for school bus passenger seating and restraining barriers.	X	X	X	X

Section I (continued)

Federal Motor Vehicle Safety Standards Applicable To School Buses

REQUIREMENTS APPLY TO SCHOOL BUSES HAVING A GVWR

Federal Standard Number, Title and Description	10,000 Pounds & Under Type A 1 & B 1	Over 10,000 Pounds Type A 2 & B 2	Over 10,000 Pounds Type C	Over 10,000 Pounds Type D
FMVSS No. 225 Child Restraint Anchorage Systems This standard establishes requirements for child restraint anchorage systems to ensure their proper location and strength for the effective securing of child restraints.	X			
FMVSS No. 301 Fuel System Integrity This standard establishes requirements for the integrity of motor vehicle fuel systems.	X	X	X	X
FMVSS No. 302 Flammability of Interior Materials This standard specifies burn resistance requirements for materials used in the occupant compartments of motor vehicles.	X	X	X	X
FMVSS No. 303 Fuel System Integrity of Compressed Natural Gas Vehicles This standard specifies requirements for the integrity of motor vehicle fuel systems using compressed natural gas (CNG), including the CNG fuel systems of bi-fuel, dedicated and dual-fuel CNG vehicles.	X	X	X	X
FMVSS No. 304 Compressed Natural Gas Fuel Container Integrity This standard specifies requirements for the integrity of compressed natural gas (CNG), motor vehicle fuel containers.	X	X	X	X
FMVSS No. 305 Electric-Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection This standard specifies requirements for limitation of electrolyte spillage, retention of propulsion batteries during a crash and electrical isolation of the chassis from the high-voltage system.	X			

Section II

Electrical Current Draw

To Determine Vehicle Electrical Load Value: The vehicle electrical load values are determined from the applicable industry average SBMTC Current Draw Table (below), with the following exceptions. The SBMTC minimum electrical load value should be increased by a total of the current draw (in amperes) of all components ordered in excess of the SBMTC current draw table and/or be reduced by a total of the current draw (in amperes) for any item omitted from the vehicle(s) ordered.

Constant Load Items	Current Draw (Amps) Per Unit	No. of Units on Bus	Total Current Draw (Amps)	Typical on Types A 1 & A 2	Typical on Types B 1 & B 2, C, D
Basic Chassis Components*				50.0	40.0
Air Conditioning**	15.00	x 1	= 15.0		
Blower, Defroster; Primary	9.50	x 1	= 9.5		9.5
Blower, Heater; Front Primary	24.00	x 1	= 24.0		24.0
Blower, Heater; Front Secondary	9.50	x 1	= 9.5		9.5
Blower, Heater; Rear, Large	14.00	x 1	= 14.0		
Blower, Heater; Underseat, Large	9.50	x 1	= 9.5		
Event Data Recorder	0.10	x 1	= 0.1		
Fan, Auxiliary; Driver's Area	2.15	x 2	= 4.3		
Fan, Roof Hatch	9.00	x 1	= 9.0		
Heater, Fuel Fired Auxiliary	13.00	x 1	= 13.0		
Heater, Steptread	6.34	x 3	= 19.0		
Heater, Water; Auxiliary Pump	5.80	x 1	= 5.8		5.8
Lamp, Clearance	0.30	x 4	= 1.2	1.2	1.2
Lamp, Clearance; Intermediate	0.30	x 2	= 0.6		0.6
Lamp, Emerg. Exit; (FMCSR)	0.30	x 1	= 0.3		
Lamp, Headlamp; Halogen	4.50	x 4	= 18.0		18.0
Lamp, Identification	0.30	x 6	= 1.8	1.8	1.8
Lamp, Marker; Front & Rear	0.30	x 4	= 1.2	1.2	1.2
Lamp, Marker; Intermediate	0.30	x 2	= 0.6		0.6
Lamp, Parking	0.59	x 4	= 2.4	2.4	2.4
Lamp, Switch Panel	0.30	x 1	= 0.3	0.3	0.3
Lamp, Tail (7")	1.75	x 2	= 3.5	3.5	3.5
Lamp, Tail/License Light (4")	0.60	x 2	= 1.2	1.2	1.2
Mirrors, Heated	2.41	x 6	= 14.5		
Monitor; Lights (Doran)	0.50	x 1	= 0.5		
Pump, Heater Water Boost	5.80	x 1	= 5.8		
Radio/PA System/8 Spkrs.	10.00	x 1	= 10.0		
Radio; Communication; Receiver	1.50	x 1	= 1.5		
School Bus Sign; Lighted	4.10	x 2	= 8.2		
Strobe Light	2.00	x 1	= 2.0		
Video Camera	1.00	x 1	= 1.0		
Windshield Wiper, Electric Motor	6.00	x 2	= 12.0	12.0	12.0
		x	=		
		x	=		
		x	=		
Total Constant Load				73.6	131.6

Note:

* Includes Headlights, Cab Heater/Defroster System, Windshield Wiper/Washer System, etc. for Type A 1 & A 2 buses.

** Air conditioner values assume engine driven compressor. Electrical current requirements for air conditioners vary widely and should be checked for each application.

Intermittent Load Items	Current Draw (Amps) Per Unit		No. of Units on Bus	=	Total Current Draw (Amps)	Operating Time (% of Route)	Average Current Draw (Amps)		Typical on Types A 1 & A 2	Typical on Types B 1 & B 2, C, D
Crossing Arm Light	1.75	x	4	=	7.0	x 35	2.5			
Crossing Arm Motor	2.50	x	1	=	2.5	x 35	0.9		0.9	0.9
Electric Power Door	3.00	x	1	=	3.0	x 35	1.1			
Horn, Backing	0.60	x	1	=	0.6	x 5	0.0			
Lamp, Area Approach	2.10	x	1	=	2.1	x 10	0.2			
Lamp, Backup	3.00	x	4	=	12.0	x 5	0.6		0.6	0.6
Lamp, Front Turn Signal	1.75	x	1	=	1.8	x 35	0.6		0.6	0.6
Lamp, Front-Side Turn Signal	1.75	x	2	=	3.5	x 35	1.2		1.2	1.2
Lamp, Rear Turn Signal (7")	1.75	x	1	=	1.8	x 35	0.6		0.6	0.6
Lamp, Stepwell	0.59	x	1	=	0.6	x 35	0.2		0.2	0.2
Lamp, Stop Lights (7")	1.90	x	2	=	3.8	x 35	1.3		1.3	1.3
Lamp, Engine Compartment	0.59	x	1	=	0.6	x 5	0.0			
Lamp, Lift Approach Area	2.10	x	1	=	2.1	x 10	0.2			
Lamp, Luggage Compartment	0.59	x	1	=	0.6	x 10	0.1			
Lamps, Dome	0.59	x	7	=	4.1	x 35	1.4		1.4	1.4
Lamps, SB Warning	5.80	x	4	=	23.2	x 35	8.1		8.1	8.1
Lamps, SB Warning, Flasher (mech)	1.70	x	4	=	6.8	x 35	2.4		2.4	2.4
Radio; Communication; Transmitter Sanders	7.50	x	1	=	7.5	x 5	0.4			
Stop Arm Lights, (Incandescent)	10.00	x	2	=	20.0	x 5	1.0			
Stop Arm Motor (Electric)	2.0	x	4	=	8.0	x 35	2.8		2.8	2.8
Wheelchair Lift	2.50	x	1	=	2.5	x 35	0.9		0.9	0.9
Wheelchair Lift Light	100.00	x	1	=	100.0	x 10	10.0			
Windshield Washer	0.59	x	1	=	0.6	x 10	0.1			
	3.50	x	1	=	3.5	x 5	0.2		0.2	0.2
		x		=						
		x		=						
		x		=						
Total Intermittent Load									21.3	21.3
Total Constant Load									73.6	131.6
Total Vehicle Load									94.8	152.8

Phantom Load (present at all times)

ABS Computer Aux. Fuel Fired Heater Clock Engine Computer Transmission Computer	Note: These items use very little current, but can run down the battery when the bus is parked for an extended period of time.
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Section III

Selection Of Charging System Components

A. Alternator (Charging Unit)

1. *Rated* or *peak* output (in amperes) should be equal to or greater than the vehicle's electrical load value determined in Section II.
2. Charge-at-idle, i.e., output (in amperes) of an alternator, as installed and measured at the engine manufacturer's recommended idle speed, should be equal to or greater than the appropriate value specified for *a minimum temperature of 0°F or below* (see Anticipated Local Minimum Temperature Selection Chart below), based upon a vehicle's electrical load value determined in Section II.

A buyer may request that all bids (or quotations) cover a higher, local anticipated *minimum temperature* selected from the Anticipated Local Minimum Temperature Selection Chart.

All alternator (charging unit) output ratings shall be established under test conditions outlined by SAE J56, "Starting Motor and Generator Curves."

Anticipated Local Minimum Temperature Selection Chart

Alternator Output in Amperes at Engine Idle

Vehicle Electrical Load Value (Amps.)	Minimum Temp Above 30°F	Minimum Temp 0°F to 30°F	Minimum Temp Below 0°F
40	16	18	20
50	20	22	25
60	24	27	30
70	28	32	35
80	32	36	40
90	36	41	45
100	40	45	50
110	44	50	55
120	48	58	60
130	52	59	65
140	56	63	70
150	60	68	75

NOTE: Minimum Anticipated Temperature is defined as *normal January daily minimum temperature* for the area in which the vehicle is not to be regularly operated, as listed in the publication *Climatological Date, National Summary*. This publication is available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

B. Voltage Regulator

1. A voltage regulator shall be provided, which is designed for close control of the system voltage.
2. Either a separately mounted regulator, or an integral alternator-regulator may be used.

C. Battery

1. Storage battery is to be furnished by the chassis supplier.
2. Storage battery supplied with vehicle should conform to SAE J537, "Storage Batteries."
3. Rating of batteries supplied with vehicle should equal or exceed:
 - a. The engine company's recommendation in CCA (Cold Cranking Amps rating at 0°F for 30 seconds) for adequate cranking of their engine at the local area minimum anticipated temperature specified as an alternator selection requirement in Part A of this Section.
 - b. An ampere-hour capacity rating which is equal numerically to the vehicle electrical load value established in Section II (+5 Amps.) and a minimum reserve capacity rating of 120 minutes at 25 amps.

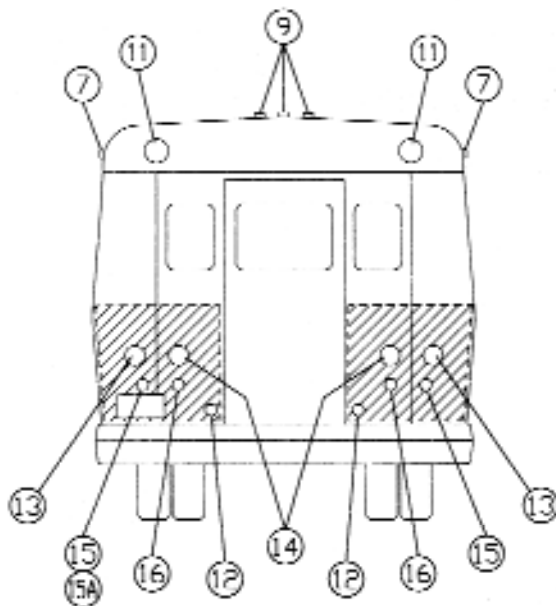
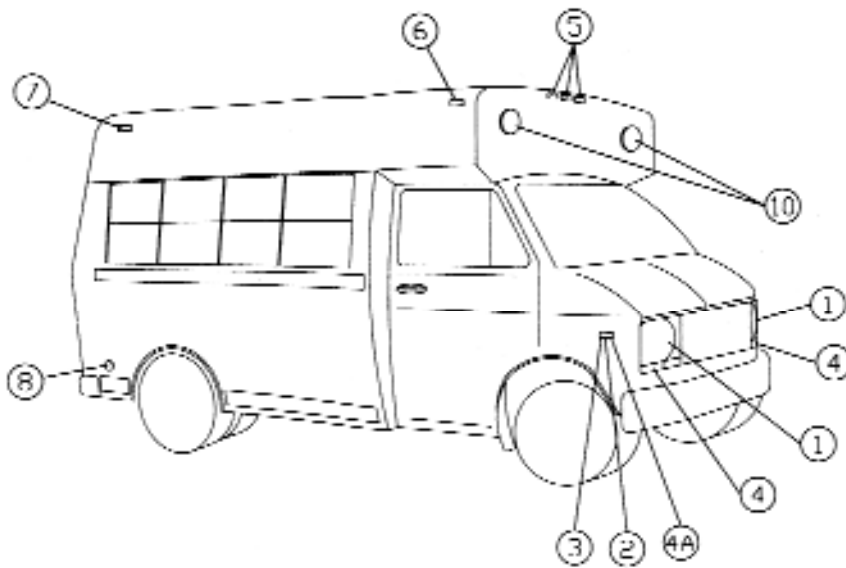
D. System Warning

The wire size and circuit connections should be such that the battery voltage is maintained within 0.3 volt of the regulator operating voltage at all load and state-of-charge conditions under which the voltage regulator is operating.

Section IV

FMVSS No. 108 Lighting Charts

For Types A 1 & A 2, B 1 & B 2, C & D Buses



LEGEND

1. HEADLAMPS (2)-WHITE (4 OPTIONAL)
2. FRONT SIDE-MARKER LAMPS (2)-AMBER
3. FRONT SIDE-REFLECTORS (2)-AMBER
4. FRONT TURN-SIGNAL LAMPS (2)-AMBER
- 4A. FRONT TURN-SIGNAL LAMPS (2)-AMBER (OPTIONAL LOCATION)
5. FRONT IDENTIFICATION LAMPS (3)-AMBER
6. FRONT CLEARANCE LAMPS (2)-AMBER
7. COMBINATION REAR CLEARANCE & SIDE-MARKER LAMPS (2)-RED (MAY BE 4 SEPERATE LAMPS, SEE S4.4 FMVSS NO. 108)
8. REAR SIDE REFLECTORS (2)-RED
9. REAR IDENTIFICATION LAMPS (3)-RED
10. FRONT SCHOOL BUS WARNING LAMPS (2)-RED (4 LAMP SYSTEM OPTIONAL - 2 RED & 2 AMBER, SEE S4.1.4 FMVSS NO. 108)
11. REAR SCHOOL BUS WARNING LAMPS (2)-RED (4 LAMP SYSTEM OPTIONAL - 2 RED & 2 AMBER, SEE S4.1.4 FMVSS NO. 108)
12. REAR BACKUP LAMP (1)-WHITE (LOCATION OPTIONAL PROVIDED OPTICAL REQUIREMENTS ARE MET)

THE GENERAL AREAS INDICATED FOR LAMPS AND REFLECTORS ARE ACCEPTABLE TO THE U.S. DEPARTMENT OF TRANSPORTATION'S NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION AND FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION. CONSULT FMVSS NO. 108 AND THE APPLICABLE TABLES THEREIN FOR EXACT REQUIREMENTS, SUCH AS: MOUNTING HEIGHT LIMITATIONS, LAMP COMBINATIONS AND ALTERNATE LOCATIONS.

THE FOLLOWING SHALL BE MOUNTED WITHIN THE DASHED AREA ACCORDING TO MANUFACTURER'S DESIGN:

13. REAR TURN-SIGNAL LAMPS (2)-RED OR AMBER
14. REAR STOP LAMPS (2)-RED
15. REAR TAILLAMPS (2)-RED
- 15A. REAR LICENSE PLATE LAMP (1)-WHITE COMBINED WITH TAILLAMP
16. REAR REFLECTORS (2)-RED

RECOMMENDED LAMP AND REFLECTOR LOCATIONS

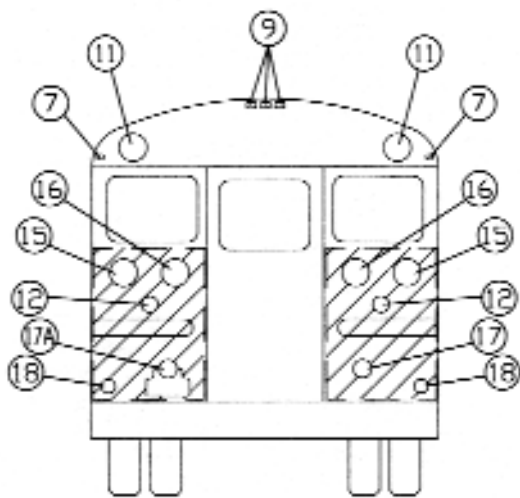
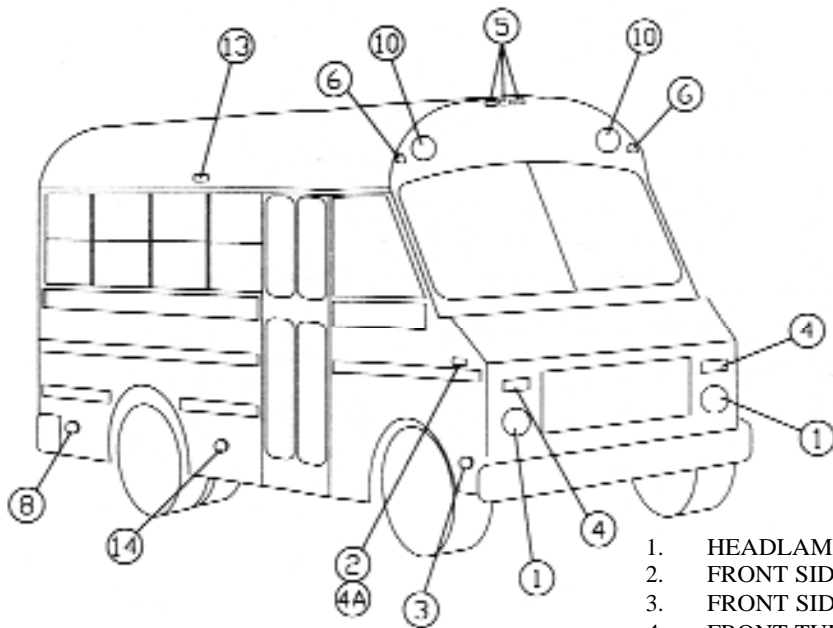
FMVSS NO. 108
 VEHICLE OF 80 OR MORE INCHES OVERALL WIDTH
 TYPE A 1 & A 2 BUS
 CUT-AWAY VAN TYPE CHASSIS

SCALE: NONE

DATE: 8-01

SBMTC

A 108-1



LEGEND

1. HEADLAMPS (2)-WHITE (4 OPTIONAL)
2. FRONT SIDE-MARKER LAMPS (2)-AMBER
3. FRONT SIDE-REFLECTORS (2)-AMBER
4. FRONT TURN-SIGNAL LAMPS (2)-AMBER
- 4A. FRONT TURN-SIGNAL LAMPS (2)-AMBER (OPTIONAL LOCATION)
5. FRONT IDENTIFICATION LAMPS (3)-AMBER
6. COMBINATION FRONT CLEARANCE & SIDE-MARKER LAMPS (2)-AMBER (MAY BE 4 SEPERATE LAMPS, SEE S4.4 FMVSS NO. 108)
7. COMBINATION REAR CLEARANCE & SIDE-MARKER LAMPS (2)-RED (MAY BE 4 SEPERATE LAMPS, SEE S4.4 FMVSS NO. 108)
8. REAR SIDE REFLECTORS (2)-RED
9. REAR IDENTIFICATION LAMPS (3)-RED
10. FRONT SCHOOL BUS WARNING LAMPS (2)-RED (4 LAMP SYSTEM OPTIONAL - 2 RED & 2 AMBER, SEE S4.1.4 FMVSS NO. 108)
11. REAR SCHOOL BUS WARNING LAMPS (2)-RED (4 LAMP SYSTEM OPTIONAL - 2 RED & 2 AMBER, SEE S4.1.4 FMVSS NO. 108)
12. REAR BACKUP LAMP (1)-WHITE (LOCATION OPTIONAL PROVIDED OPTICAL REQUIREMENTS ARE MET)
13. INTERMEDIATE SIDE-MARKER LAMPS (2)-AMBER (IF VEHICLE IS 30' OR MORE OVERALL LENGTH)
14. INTERMEDIATE SIDE-REFLECTORS (2)-AMBER (IF VEHICLE IS 30' OR MORE OVERALL LENGTH)

THE GENERAL AREAS INDICATED FOR LAMPS AND REFLECTORS ARE ACCEPTABLE TO THE U.S. DEPARTMENT OF TRANSPORTATION'S NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION AND FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION. CONSULT FMVSS NO. 108 AND THE APPLICABLE TABLES THEREIN FOR EXACT REQUIREMENTS, SUCH AS: MOUNTING HEIGHT LIMITATIONS, LAMP COMBINATIONS AND ALTERNATE LOCATIONS.

THE FOLLOWING SHALL BE MOUNTED WITHIN THE DASHED AREA ACCORDING TO MANUFACTURER'S DESIGN:

15. REAR TURN-SIGNAL LAMPS (2)-RED OR AMBER
16. REAR STOP LAMPS (2)-RED
17. REAR TAILLAMPS (2)-RED
- 17A. REAR LICENSE PLATE LAMP (1)-WHITE COMBINED WITH TAILLAMP
18. REAR REFLECTORS (2)-RED

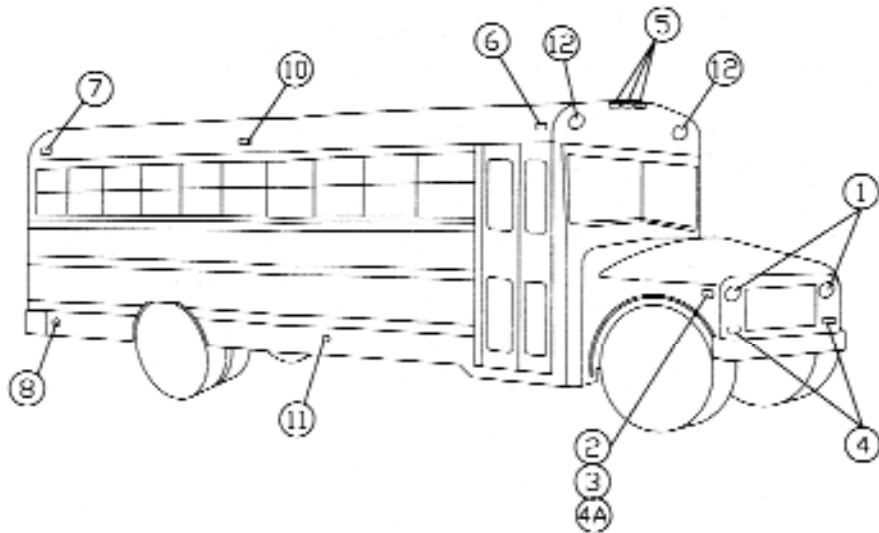
RECOMMENDED LAMP AND REFLECTOR LOCATIONS
 FMVSS NO. 108
 VEHICLE OF 80 OR MORE INCHES OVERALL WIDTH
 TYPE B 1 & B 2 BUS

SCALE: NONE

DATE: 8-01

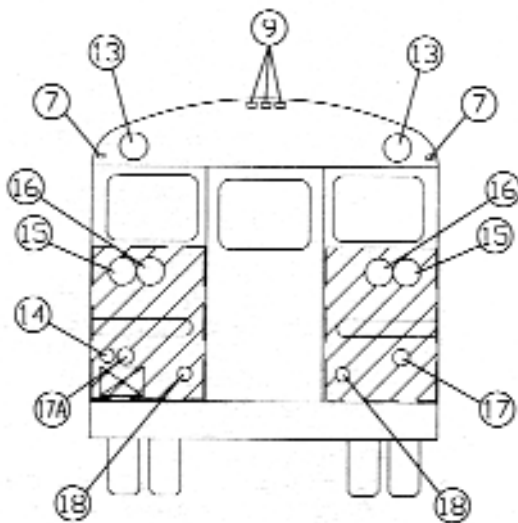
SBMTC

B 108-1



LEGEND

1. HEADLAMPS (2)-WHITE (4 OPTIONAL)
2. FRONT SIDE-MARKER LAMPS (2)-AMBER
3. FRONT SIDE-REFLECTORS (2)-AMBER
4. FRONT TURN-SIGNAL LAMPS (2)-AMBER
- 4A. FRONT TURN-SIGNAL LAMPS (2)-AMBER (OPTIONAL LOCATION)
5. FRONT IDENTIFICATION LAMPS (3)-AMBER
6. FRONT CLEARANCE LAMPS (2)-AMBER
7. COMBINATION REAR CLEARANCE & SIDE-MARKER LAMPS (2)-RED (MAY BE 4 SEPERATE LAMPS, SEE S4.4 FMVSS NO. 108)
8. REAR SIDE REFLECTORS (2)-RED
9. REAR IDENTIFICATION LAMPS (3)-RED
10. INTERMEDIATE SIDE-MARKER LAMPS (2)-AMBER (IF VEHICLE IS 30' OR MORE OVERALL LENGTH)
11. INTERMEDIATE SIDE-REFLECTORS (2)-AMBER (IF VEHICLE IS 30' OR MORE OVERALL LENGTH)
12. FRONT SCHOOL BUS WARNING LAMPS (2)-RED (4 LAMP SYSTEM OPTIONAL - 2 RED & 2 AMBER, SEE S4.1.4 FMVSS NO. 108)
13. REAR SCHOOL BUS WARNING LAMPS (2)-RED (4 LAMP SYSTEM OPTIONAL - 2 RED & 2 AMBER, SEE S4.1.4 FMVSS NO. 108)
14. REAR BACKUP LAMP (1)-WHITE (LOCATION OPTIONAL PROVIDED OPTICAL REQUIREMENTS ARE MET)



THE GENERAL AREAS INDICATED FOR LAMPS AND REFLECTORS ARE ACCEPTABLE TO THE U.S. DEPARTMENT OF TRANSPORTATION'S NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION AND FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION. CONSULT FMVSS NO. 108 AND THE APPLICABLE TABLES THEREIN FOR EXACT REQUIREMENTS, SUCH AS: MOUNTING HEIGHT LIMITATIONS, LAMP COMBINATIONS AND ALTERNATE LOCATIONS.

THE FOLLOWING SHALL BE MOUNTED WITHIN THE DASHED AREA ACCORDING TO MANUFACTURER'S DESIGN:

15. REAR TURN-SIGNAL LAMPS (2)-RED OR AMBER
16. REAR STOP LAMPS (2)-RED
17. REAR TAILLAMPS (2)-RED
- 17A. REAR LICENSE PLATE LAMP (1)-WHITE COMBINED WITH TAILLAMP
18. REAR REFLECTORS (2)-RED

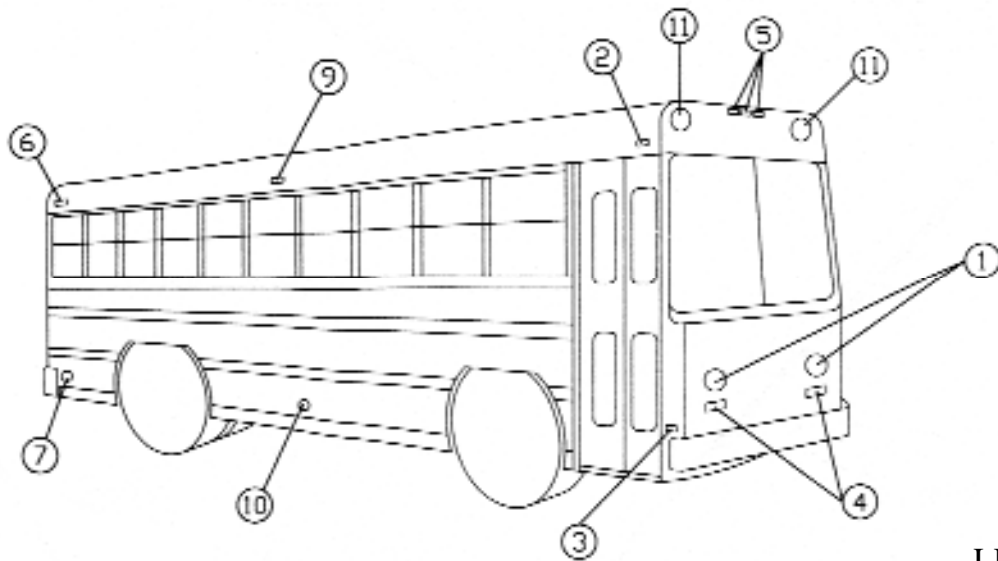
RECOMMENDED LAMP AND REFLECTOR LOCATIONS
 FMVSS NO. 108
 VEHICLE OF 80 OR MORE INCHES OVERALL WIDTH
 TYPE C BUS

SCALE: NONE

DATE: 8-01

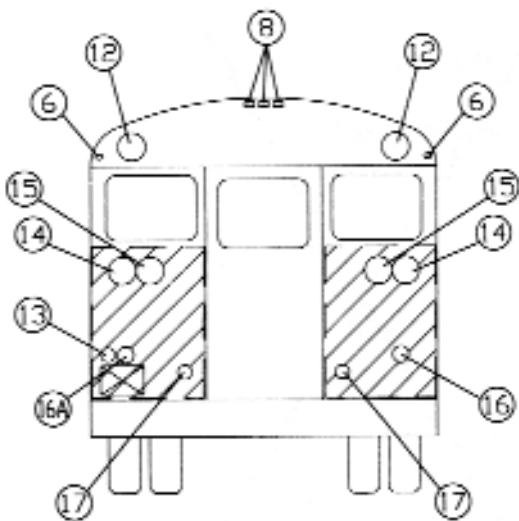
SBMTC

C 108-1



LEGEND

1. HEADLAMPS (2)-WHITE (4 OPTIONAL)
2. COMBINATION FRONT CLEARANCE & SIDE-MARKER LAMPS (2)-AMBER (MAY BE 4 SEPERATE LAMPS, SEE S4.4 FED. STD. NO. 108)
3. FRONT SIDE-REFLECTORS (2)-AMBER
4. FRONT TURN-SIGNAL LAMPS (2)-AMBER
5. FRONT IDENTIFICATION LAMPS (3)-AMBER
6. COMBINATION REAR CLEARANCE & SIDE-MARKER LAMPS (2)-RED (MAY BE 4 SEPERATE LAMPS, SEE S4.4 FMVSS NO. 108)
7. REAR SIDE REFLECTORS (2)-RED
8. REAR IDENTIFICATION LAMPS (3)-RED
9. INTERMEDIATE SIDE-MARKER LAMPS (2)-AMBER (IF VEHICLE IS 30' OR MORE OVERALL LENGTH)
10. INTERMEDIATE SIDE-REFLECTORS (2)-AMBER (IF VEHICLE IS 30' OR MORE OVERALL LENGTH)
11. FRONT SCHOOL BUS WARNING LAMPS (2)-RED (4 LAMP SYSTEM OPTIONAL - 2 RED & 2 AMBER, SEE S4.1.4 FMVSS NO. 108)
12. REAR SCHOOL BUS WARNING LAMPS (2)-RED (4 LAMP SYSTEM OPTIONAL - 2 RED & 2 AMBER, SEE S4.1.4 FMVSS NO. 108)
13. REAR BACKUP LAMP (1)-WHITE (LOCATION OPTIONAL PROVIDED OPTICAL REQUIREMENTS ARE MET)



THE GENERAL AREAS INDICATED FOR LAMPS AND REFLECTORS ARE ACCEPTABLE TO THE U.S. DEPARTMENT OF TRANSPORTATION'S NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION AND FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION. CONSULT FMVSS NO. 108 AND THE APPLICABLE TABLES THEREIN FOR EXACT REQUIREMENTS, SUCH AS: MOUNTING HEIGHT LIMITATIONS, LAMP COMBINATIONS AND ALTERNATE LOCATIONS.

THE FOLLOWING SHALL BE MOUNTED WITHIN THE DASHED AREA ACCORDING TO MANUFACTURER'S DESIGN:

14. REAR TURN-SIGNAL LAMPS (2)-RED OR AMBER
15. REAR STOP LAMPS (2)-RED
16. REAR TAILLAMPS (2)-RED
- 16A. REAR LICENSE PLATE LAMP (1)-WHITE COMBINED WITH TAILLAMP
17. REAR REFLECTORS (2)-RED

RECOMMENDED LAMP AND REFLECTOR LOCATIONS
FMVSS NO. 108
VEHICLE OF 80 OR MORE INCHES OVERALL WIDTH
TYPE D BUS

SCALE: NONE

DATE: 8-01

SBMTC

D 108-1

School Bus Manufacturers Technical Council

The School Bus Manufacturers Technical Council (SBMTC), an organization within the National Association of State Directors of Pupil Transportation Services, was established in 1995. SBMTC operates and functions as the industry's technical advisor. The school transportation industry requires a method of technical communication, and SBMTC is the tool to accomplish this purpose. The council provides a forum in which council members can address technical and government-related issues concerning the manufacture and acceptability of school bus chassis and school bus bodies.

The goals and objectives for which SBMTC is organized are:

1. Encourage and promote safety in the design of school buses;
2. Assist the National Association of State Directors of Pupil Transportation Services through communication of design trends, historical data and other information pertaining to the pupil transportation industry;
3. Communicate to member companies actions by the National Highway Traffic Safety Administration and other governmental agencies as they affect the school bus industry;
4. Keep open communications between school bus chassis and bus body manufacturers on technical issues;
5. Develop and issue appropriate "Position Papers;"
6. Assist the National Conference on School Transportation; and
7. Work jointly with other associations and societies to assist in the achievement of SBMTC goals and objectives.

