

# Minnesota Department of Public Safety

## Office of Pupil Transportation Inspection Manual



### Abstract

In 1971, the Departments of Education and Public Safety aligned with a mutual goal of improving and maintaining student transportation safety. As this goal evolved through the years, the State Patrol created the Office of Pupil Transportation based on a 2008 legislative study that created a healthy oversight to carry the goal of safety into the future. The legislative study reiterated the importance of conducting annual inspections with a point value grading system, along with random and post-crash inspections. The school bus inspection manual – developed and updated with revisions – provides the essential path to compliance with all applicable school bus safety standards.

Lieutenant Brian Reu, Director  
brian.reu@state.mn.us





# School Bus Inspection Manual

Revised January 2022

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## Introduction

This manual is an in-depth guide for navigating the vast number of requirements a school bus dealer, school district, school bus contractor, or State Patrol school bus inspector must use to ensure the safety of all school buses operated within the state of Minnesota. State statutes and rules, along with federal laws, govern school bus design, manufacture and operation for the purpose of assuring the safe transportation of schoolchildren.

The Department of Public Safety has the primary responsibility for school transportation safety. To oversee school transportation safety, the commissioner of public safety or the commissioner's designee shall serve as director of pupil transportation. The law assigns to the Department of Public Safety the responsibility of annual school bus inspections to determine adherence to state law.

This manual was established in accordance with [Minnesota Statutes, section \(MSS\) 169.4501, subdivision 3](#), requiring the State Patrol to develop inspection procedures based on the national standards and Minnesota standards adopted by applicable state statutes. The State Patrol uses the manual as the basis for inspecting buses as provided in [MSS 169.451](#).

Chapters 1 through 10 contain the school bus standards and inspection procedures that apply to Types A, B, C, D and Type III school buses, along with multi-function school buses. In Chapter 11, you will find the School Bus Recommended Out-of-Service Criteria from the most recent edition of the National School Transportation Specifications and Procedures adopted by the National Congress on School Transportation.

The manual is organized predominately in alphabetical order, with the exception of standards, which are presented first. The standard acts as the overarching authority related to a given component. Sources are cited throughout the manual, with an exception: The majority of the school bus standards are adopted from the National School Transportation Specifications and Procedures (NSTSP). If a particular chapter/section is absent of any state or federal law citation, it is safe to assume the source is the NSTSP adopted through [MSS 169.4501](#). If multiple laws (state or federal) are cited, [MSS 169.4501](#) will also be cited (when applicable) to ensure the reader has a full comprehension of the applicable law(s)/standard(s).

The manual is organized in an outline format. The order is number, letter, number and so forth. Reading left to right, the first number indicates the chapter, followed by the section letter and paragraph number(s). This designation will mirror the violation code on the Driver/Vehicle Examination Report (DVER) when an equipment deficiency is documented.

When does my bus need to meet a given NSTSP standard? The National Congress on Student Transportation updates the NSTSP every five years. The state legislature adopted the NSTSP as listed.

1990 - Effective January 1, 1995

2010 - Effective January 1, 2013

1995 - Effective January 1, 1998

2015 - Effective July 1, 2017

2000 - Effective November 1, 2004

2020 - No Congress held due to COVID.

2005 - Effective January 1, 2008

Effective dates varied prior to 2017, at which time the Minnesota legislature amended [MSS 169.4501, subdivision 2\(b\)](#), which now states the standards apply to school buses manufactured after Aug. 1 of the year following a year in which a revised edition of the NSTSP is adopted. Buses complying with the standards



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when manufactured need not comply with standards established later, except as specifically provided for by law.

[MSS 169.4501, subdivision 2\(c\)](#) states a school bus manufactured on or before the date provided by paragraph (b) must conform to the Minnesota standards in effect on the date the vehicle was manufactured, except as specifically provided for in law.

For complete statutory or rule language, review the applicable laws/rules below.

❖ State Law/Rule:

- [MSS 168](#) – Registration Highway Traffic Regulation Act
- [MSS 169](#) – Traffic regulations
- [MSS 171](#) – Driver’s license law
- [MSS 299A](#) – Wheelchair securement devices
- [MN Rule 7470](#) - School bus operations adopted pursuant to [MSS 169.449, subdivision 1](#)
- [MN Rule 7414](#) – School bus driver qualifications

❖ Federal Law:

- [49 CFR 571](#) (FMVSS) – establishes manufacturing standards for vehicles
- [49 CFR 570](#) – establishes vehicles inspections standards

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## Terminology

ANSI American National Standards Institute

CFR Code of Federal Regulations

CVSA Commercial Vehicle Safety Alliance

DVER Driver/Vehicle Examination Report

FMVSS Federal Motor Vehicle Safety Standards

When searching for the actual FMVSS regulation, you'll find FMVSS filed under Title 49 of the Code of Federal Regulations in Chapter 571, followed by the section number. An example is wheelchair lift requirements – 49 CFR 571.403. When cited in this manual, it will be listed as FMVSS 403.

GVWR Gross Vehicle Weight Rating

MSS Minnesota State Statute

NC Not Certified

NCST National Congress on Student Transportation

NSBY National School Bus Yellow

NSTSP National School Transportation Specifications and Procedures

OEM Original Equipment Manufacturer

SAE Society of Automotive Engineers

SBIM School Bus Inspection Manual

SBMTC School Bus Manufacturers Technical Council

WTORS Wheelchair Tiedown and Occupant Restraint System

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## Vehicle Descriptions

A school bus ([MSS 169.011, subdivision 71](#)) means a motor vehicle used to transport pupils to or from a school defined in [MSS 120A.22](#), or to or from school-related activities, by the school or a school district, or by someone under an agreement with the school or a school district. A school bus does not include a motor vehicle transporting children to or from school for which parents or guardians receive direct compensation from a school district, a motor coach operating under charter carrier authority, a transit bus providing services as defined in [MSS 174.22, subdivision 7](#), or a vehicle otherwise qualifying as a Type III vehicle under paragraph 5, when the vehicle is properly registered and insured and being driven by an employee or agent of a school district for nonscheduled or non-regular transportation. A school bus may be a Type A, B, C, D, or Type III as follows:

### 1. Type A School Bus

This is a van conversion or bus constructed on a van-type or cutaway front section vehicle with a left-side driver's door, designed for carrying more than 10 persons. This definition includes two Type-A classifications:

- ❖ Type A-I has a GVWR of 14,500 lbs. or less.
- ❖ Type A-II has a GVWR greater than 14,500 lbs. but less than 21,501 lbs.



### 2. Type B School Bus

This is a conversion or body constructed and installed on a van or front-section vehicle chassis, or stripped chassis, with a GVWR greater than 10,000 lbs. designed for carrying more than 10 persons. Part of the engine is beneath or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels.



### 3. Type C School Bus

This is constructed using a chassis with a hood and front fender assembly. The entrance door is behind the front wheels. It also includes a cutaway truck chassis or truck chassis with cab, with or without a left side door, and has a GVWR greater than 21,500 lbs.



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## 4. Type D School Bus

This is a body installed on a chassis with the engine mounted in the front, midship or rear, with a GVWR greater than 10,000 lbs., designed for carrying more than 10 persons. The engine may be behind the windshield and beside the driver's seat; it may be at the rear of the bus, behind the rear wheels, or midship between the front and rear axles. The entrance door is ahead of the front wheels. A Type D school bus has a maximum length of 45 feet.



## 5. Type III Vehicle

This type of vehicle is restricted to passenger vehicles and buses having a maximum manufacturer's rated seating capacity of 10 or fewer people, including the driver, and a GVWR of 10,000 lbs. or less. A Type III vehicle must not be outwardly equipped and identified as a Type A, B, C, or D school bus. A van or bus converted to a seating capacity of 10 or fewer people must have been originally manufactured to comply with the passenger safety standards.

A Type III vehicle that has reached 12 years of age from the date of manufacture will no longer be inspected or allowed to be used as a school bus.



## 6. Head Start Bus

Per MSS 169.011, subdivision 34, Head Start bus means a motor vehicle used to transport children and parents to or from a Head Start facility, or to or from Head Start-related activities, by the Head Start grantee, or by someone under an agreement with the Head Start grantee. A Head Start bus may be a type A, B, C, or D bus.

A Head Start bus manufactured after December 31, 1994, must meet the same standards as a type A, B, C, or D school bus, except that a Head Start bus is not required to be equipped with the warning signals required for a school bus. A Head Start bus that is not equipped as a school bus must be painted colors other than national school bus yellow.

A type III vehicle cannot be used as a Head Start bus.

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## Vehicle Registration

### Types B, C and D Buses

Types B, C and D school buses may be registered in any of the following applicable classes: school bus (SB), bus (BY), tax-exempt or apportioned.

For first-time use, a pre-registration certificate is required as outlined on page 14 under [Certification](#). Tax-exempt plates require the name of the political subdivision on both sides of the bus as required by [MSS 168.012](#). Bus license plates (BY) require the name of the charter operator displayed on both sides of the power unit as required by [MSS 221.031, subdivision 6](#).

### Charter/Non School Bus Transportation

Buses used on charter/non-school bus transportation trips must have bus (BY) or apportioned (AP) license plates and conform to lettering requirements including the covering of the word "school" in school bus. Buses with passenger or apportioned license plates must conform to the federal equipment requirements. Tax-exempt plates may only be used by the school district that owns the school buses to provide their own transportation. Contractors are prohibited from using tax-exempt license plates.

School buses are exempt ([MSS 221.025](#)) from the motor carrier of passengers permit ([MSS 221.0252](#)), provided all the following criteria are met:

1. The passengers are students.
2. The students are going to or from school-sponsored activities.
3. The bus is a school bus that has been inspected and certified as a school bus by the State Patrol pursuant to [MSS 169.451](#).

A charter trip means carrying passengers other than students/non-school functions. Charter trips require operating authority and are subject to all Minnesota Motor Carrier laws under [MSS 221](#) and rules adopted therein.

A school bus providing transportation across state lines is subject to all Federal Motor Carrier Safety regulations ([49 CFR, Parts 390-399](#)), unless transporting only schoolchildren and/or school personnel from home to school and from school to home.

### Type A Buses

Requirements for Type A school buses are the same as those for Types B, C and D, except that those with a manufacturer's rated capacity of 15 passengers or fewer including the driver may not register as a bus (BY). Those used in charter operations must register in the passenger car class.

### Type III Buses

A Type III bus can only be registered in the following registration classes:

1. Tax exempt: Those of political subdivisions.
2. School bus (SB): Those vehicles used exclusively for student transportation.
3. Passenger automobile license plates.
4. Bus Plates (BY): Every motor vehicle certified by the Department of Transportation as a special transportation service provider vehicle and receiving reimbursement as provided in [MSS 256B.0625, subdivision 17](#), and used a Type III bus.

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## Driver's License

A class A or B commercial driver's license (CDL) and school bus and passenger endorsements are required when driving a school bus with a GVWR of 26,001 lbs. or more. A properly endorsed class C CDL is required when the GVWR is less than 26,001 lbs., but the manufacturer's rated seating capacity is 16 or more, including the driver. A driver must be medically qualified as required by [MSS 171.321, subdivision 2](#).

### Type A Buses

One of two licenses will be required when operating a Type A-I or Type A-II school bus. This is dependent on the transportation use.

1. A class D license is permissible when driving a Type A-I school bus. The school bus must be used exclusively as an activities bus by a school district meeting the requirements of [MSS 171.02, subdivision 2\(a\)](#). This includes a manufacturer's rated capacity of 15 passengers or fewer, including driver, and a GVWR of 14,500 lbs. or less.
2. A minimum of a class C license with a school bus endorsement is required when driving a Type A-II school bus. It is required when providing home-to-school or school-to-home transportation.

### Type III Buses

A class D driver's license is required for a driver of a Type III school bus. The driver must meet the requirements outlined in [MSS 171.02, subdivision 2\(b\)](#).

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## Certification

A school bus shall not be used to transport students unless it displays a current annual or interim certificate.

### **New School Buses—Types A, B, C and D**

A pre-registration certificate is required of a new school bus being registered for the first time in Minnesota. The two-part form required by [MSS 168.102](#) must state the school bus complies with Minnesota school bus standards. Part one applies to the chassis dealer, and part two applies to the body dealer. The body dealer may certify both the school bus chassis and body by signing both forms if they so choose.

### **Used School Buses—Types A, B, C and D**

A used school bus that has once been registered and certified in Minnesota, and is returning to service in Minnesota, must conform to the school bus standards in effect on the date of manufacture. A used school bus that has never been inspected in Minnesota must conform to current Minnesota standards.

If a school bus certificate is not present or is expired, the State Patrol must inspect and certify the school bus meets the applicable minimum school bus standards for design, color and equipment before issuing a certificate.

### **Specially Equipped Bus**

A specially equipped bus must be inspected and certified by the State Patrol before it can be used to transport occupants requiring the use of a Wheelchair Tie Down and Occupant Restraint System (WTORS).

### **Type III**

A Type III vehicle put into service as a school bus must obtain an interim inspection from a dealer or be certified by the State Patrol before first use.

### **Broken Windshields or Damaged Stickers**

If a certificate becomes damaged, or a windshield must be replaced, contact the regional inspector and provide them with the vehicle information and a new certificate will be supplied.

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## Certificate Types

### Interim Certificate

The interim certificate is issued to an authorized school bus dealer for placement on a new school bus or buses operated in Minnesota.

The dealer must certify to the state of Minnesota by means of a pre-registration certificate, before registration plates are issued, that the bus meets Minnesota Minimum School Bus Standards. The interim certificate (Fig. 1) is placed on the lower left front corner of the windshield. The certificate is valid for the period of 13 months from the month of issuance.



Figure 1. Exterior View



Figure 1. Interior View

### Rejection Sticker

A school bus on which has been discovered one or more defects described in the NSTSP out of service criteria, shall be deemed unsafe for the transportation of school children. A rejection sticker (Fig. 2) will be placed on the lower left corner of the windshield. The sticker shall be removed only upon authorization from a member of the State Patrol who has determined that all defects have been corrected. Pending re-inspection and certification of the vehicle by a member of the State Patrol, a bus bearing a rejection sticker may be used to transport students if the defects have been corrected and the vehicle examination report is signed by the owner or a designee certifying that all defects have been corrected. The signed report shall be carried in the first aid kit on the bus.

A defect discovered during an inspection that was identified during a previous inspection but has not been corrected results in a failed inspection. A rejection sticker shall be affixed to the lower left corner of the windshield.

The rejection sticker may *only* be removed upon authorization from a school bus inspector or trooper assigned to the Office of Pupil Transportation Safety (OOPTS). The OOPTS designee must determine the defect(s) causing the rejection and all other defects have been corrected.



Figure 2 Exterior View

### School Bus and Wheelchair Securement Device Certificate



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A school bus that has had an inspection completed in which no out-of-service defects were identified is deemed to have passed the inspection and an inspection certificate (Fig. 3) shall be affixed to the lower left corner of the windshield. All defects identified must be repaired within 14 days of the inspection. The person completing the repairs shall sign and date the inspection report indicating the repairs were made. The inspection report must be retained at the principle place of business of the carrier or school district for 12 months following the inspection and must be available for review by a representative of the commissioner of public safety.

If applicable, the inspector will indicate the number of approved wheelchair securement device(s) in the box provided to the right of the Wheelchair Securement Devices section. If additional securement devices are placed in the vehicle, the vehicle *must* be re-inspected to ensure the devices meet the inspection criteria.



Figure 3. Exterior View

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## Inspections

### **Scheduled**

All school buses will be inspected on an annual basis by the State Patrol pursuant to [MSS 169.451](#). School bus inspectors shall schedule annual inspections with school districts and fleet operators, as well as re-inspections to verify correction of deficiencies.

### **Unscheduled**

Inspectors may conduct unscheduled or unannounced spot checks of any school bus at the location where a bus is kept when not in operation. All such inspections will be completed in accordance with [MSS 169.451](#).

### **Roadside**

Unannounced destination/roadside inspections may be conducted. One or more defects that would render the vehicle out of service during an annual inspection will not place the school bus out of service, unless a similar defect is listed in the Commercial Vehicle Safety Alliance (CVSA) out-of-service criteria. School buses should be inspected at a safe location.

### **Inspection Criteria**

All inspections will be performed in accordance with this manual. Established criteria should be followed to assure uniform inspections statewide. Updates to the manual will be issued as needed by law changes, new products or interpretations. The manual is designed to indicate the criteria and procedures for all inspections. When there are definitive changes to a standard, the manual indicates criteria for before and after the effective date. In general, buses will meet the criteria effective on the date of manufacture. This does not prohibit updating older buses to newer standards, provided the update does not lessen the prevailing standard at time of manufacture.

### **Rule or Law Interpretation**

Questions of laws, rules or inspection criteria may be presented to the state pupil transportation safety director or the school bus inspection coordinator. Comments or questions on procedures in this manual may be addressed to an area school bus inspector or the school bus inspection coordinator.

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## First-Time Inspection

During the first-time inspection by the State Patrol or a school bus dealer, each item will be checked for conformity to the school bus design standards in [MSS 169.4501 through 169.4504](#) or [169.454](#). The first-time inspection criteria will be based on a certified/not certified designation. All items found to be non-compliant must be corrected before a certificate is issued. A school bus must not be used until it displays either a current interim or annual certificate.

Wheelchair-equipped school buses must undergo an inspection by the State Patrol prior to transporting passengers requiring the use of a mobility aid per [MSS 299A.14](#).

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## Interior Inspection Items

Item	Violation Code	Item	Violation Code
<input type="checkbox"/> Aisles/Exits Obstructed	1.A	<input type="checkbox"/> Mirror (Interior)	1.P
<input type="checkbox"/> Body Condition	1.B	<input type="checkbox"/> Safety Equipment – Body Fluid Kit	7.A
<input type="checkbox"/> Brakes – Service	2.A	<input type="checkbox"/> Safety Equipment – Seat Belt Cutter	7.C
<input type="checkbox"/> Brakes – Parking/Emergency	2.A and 2.F	<input type="checkbox"/> Safety Equipment – Triangle Warning Devices	7.D
<input type="checkbox"/> Defroster/Heater	1.E	<input type="checkbox"/> Safety Equipment – Fire Extinguisher and First Aid Kit	7.B
<input type="checkbox"/> Dimensions (Interior Height)	1.D	<input type="checkbox"/> Seats Standard	1.R
<input type="checkbox"/> Doors	1.F	<input type="checkbox"/> Steering Wheel	3.L
<input type="checkbox"/> Emergency Exits	1.G	<input type="checkbox"/> Steps	1.T
<input type="checkbox"/> Firewall Openings	1.H	<input type="checkbox"/> Storage Compartment	3.N
<input type="checkbox"/> Floor Construction	1.I	<input type="checkbox"/> Student Pedestrian System	8.B and 8.D.1
<input type="checkbox"/> Handrails	1.J	<input type="checkbox"/> Sunshield	1.U
<input type="checkbox"/> Hazardous Protuberance/Sharp Edge(s)	1.K	<input type="checkbox"/> Transmission (Gear Shifter)	3.R
<input type="checkbox"/> Horn	3.K	<input type="checkbox"/> Two-Way Communication	7.E
<input type="checkbox"/> Instruments/Instrument Panel	1.L	<input type="checkbox"/> Type III	10
<input type="checkbox"/> Interior Cleanliness/Loose Objects	1.M	<input type="checkbox"/> Ventilation	1.W
<input type="checkbox"/> Lamps/Signals (Interior)	5.P-5.W	<input type="checkbox"/> Windows Window Glass	1.Y
<input type="checkbox"/> Lettering/Markings – Recording Device Notice	6.A	<input type="checkbox"/> Wiring	1.Z and 3.E.6
<b>Specialty Equipped School Buses (SESB)</b>			
<input type="checkbox"/> SESB – Aisles	9.A	<input type="checkbox"/> SESB – Special Entrance	9.F
<input type="checkbox"/> SESB – Identification (International Symbol)	9.C	<input type="checkbox"/> SESB – Special Service Entrance Door(s)	9.G
<input type="checkbox"/> SESB – Occupant Restraint	9.D	<input type="checkbox"/> SESB – Support Equipment and Accessories	9.H
<input type="checkbox"/> SESB – Two-Way Communications	9.I	<input type="checkbox"/> SESB – Wheelchair Tiedown/Occupant Restraint System (WTORS)	9.J

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## Exterior Inspection Items

Item	Violation Code	Item	Violation Code
<input type="checkbox"/> Body Condition	1.B	<input type="checkbox"/> Mirrors (Exterior)	1.O
<input type="checkbox"/> Bumpers	3.B	<input type="checkbox"/> Rub Rails	1.Q
<input type="checkbox"/> Brakes – Drums and Rotors	2.E	<input type="checkbox"/> Stirrup Steps	1.T
<input type="checkbox"/> Color (Body, Rub Rails, Bumper)	4	<input type="checkbox"/> Storage Compartment	3.N
<input type="checkbox"/> Dimensions – Length and Width	1.D	<input type="checkbox"/> Student Pedestrian System	8
<input type="checkbox"/> Doors	1.F	<input type="checkbox"/> Tires/Traction	3.O
<input type="checkbox"/> Emergency Exits	1.G	<input type="checkbox"/> Towing Attachments Points	3.Q
<input type="checkbox"/> Exhaust System	3.G	<input type="checkbox"/> Trailer Hitch Receiver	3.P
<input type="checkbox"/> Fenders (Front)	3.H	<input type="checkbox"/> Ventilation	1.W
<input type="checkbox"/> Firewall Openings	1.H	<input type="checkbox"/> Wheel Bearings/Hubs	3.S
<input type="checkbox"/> Hazardous Protuberance/Sharp Edges	1.K	<input type="checkbox"/> Wheel Fasteners	3.T
<input type="checkbox"/> Lamps/Signals (Exterior)	5.A-5.O	<input type="checkbox"/> Wheel Housing	1.X
<input type="checkbox"/> Lettering/Markings – Prohibited Lettering	6.B	<input type="checkbox"/> Wheels	3.U
<input type="checkbox"/> Lettering/Markings – Reflective Material	6.G	<input type="checkbox"/> Windows and Window Glass	1.Y
<input type="checkbox"/> Lettering/Markings – School Bus Signs/ Identification	6.C and 6.D	<input type="checkbox"/> Windshield Wipers	1.Y.2
<input type="checkbox"/> Lettering/Markings – Tax Exempt Buses	6.F	<input type="checkbox"/> Windshield Washer System	1.Y.3
<input type="checkbox"/> Metal Treatment	1.N		
<b>Specially Equipped School Buses (SESB)</b>			
<input type="checkbox"/> SESB – Annual Certificate	9.B	<input type="checkbox"/> SESB – Ramp	9.E.4
<input type="checkbox"/> SESB – Identification (International Symbol)	9.C	<input type="checkbox"/> SESB – Special Entrance	9.F
<input type="checkbox"/> SESB – Power Lift	9.E	<input type="checkbox"/> SESB – Special Service Entrance Door(s)	9.G

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## Undercarriage/Under-the-Hood Inspection Items

Item	Violation Code	Item	Violation Code
<input type="checkbox"/> Body Mounting	3.A	<input type="checkbox"/> Fuel System/Fuel Tank	3.J
<input type="checkbox"/> Brakes – Air/Hydraulic	2.B and 2.C	<input type="checkbox"/> Horn	3.K
<input type="checkbox"/> Brakes – Hoses	2.A, 2.B.3, and 2.C.1	<input type="checkbox"/> Steering	3.L
<input type="checkbox"/> Brakes – Parking/Emergency	2.A and 2.F	<input type="checkbox"/> Storage Compartment	3.N
<input type="checkbox"/> Brakes – Service	2.A, 2.D and 2.E	<input type="checkbox"/> Suspension	3.M
<input type="checkbox"/> Crossmembers	1.C	<input type="checkbox"/> Trailer Hitch Receiver	3.P
<input type="checkbox"/> Differential	3.C	<input type="checkbox"/> Transmission	3.R
<input type="checkbox"/> Driveshaft	3.D	<input type="checkbox"/> Type III	10
<input type="checkbox"/> Electrical System	3.E	<input type="checkbox"/> Undercoating	1.V
<input type="checkbox"/> Exhaust System	3.G	<input type="checkbox"/> Wheel Housing	1.X
<input type="checkbox"/> Firewall Openings	1.H	<input type="checkbox"/> Wiring	1.Z and 3.E.6
<input type="checkbox"/> Frame	3.I		

# School Bus Inspection Manual

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## 1. Body

### Item/Method of Inspection

#### 1.A. Aisles and Exits Obstructed

- ❖ [MSS 169.447](#) and [169.4501](#)
- ❖ [FMVSS 217](#)

- A. All emergency exit doors shall be accessible by a 12-inch minimum aisle. The aisle shall not be obstructed at any time by any type of barrier, such as a wheelchair or tie-down, cargo or seat – unless a flip-up seat is installed and occupied. A flip-up seat in the unoccupied/raised position shall not obstruct the 12-inch minimum aisle to any side emergency exit door. The track of a track seating system is exempt from this requirement.
- B. Measure aisle width and seat backs for compliance with aisle requirements.
- C. The minimum clearance of all bus-length aisle widths, including the aisles or passageway between seats leading to the emergency door, must be 12 inches. Aisle supports of seat backs must be slanted away from the aisle sufficiently to give aisle clearance of 15 inches at the top of the seat backs. This applies to buses manufactured prior to Jan. 1, 2013.
- D. An emergency door opening must be a minimum of 24 inches wide by 45 inches high for Types B, C and D, and 22 inches wide by 45 inches high for a Type A school buses.

#### 1.B. Body Condition

- A. Any panel, rub rail or trim that is loose, torn, dislocated or protruding from the surface of the bus, creating a hazard (393.203); or
- B. Any engine, battery or other door that is not properly secured (393.203).

#### 1.C. Crossmembers

- ❖ [49 CFR 393.201](#)

- A. Any cross member, outrigger or other structural support which is cracked, missing, deformed, or has rust holes.
- B. Any area of the floor that is sagging or soft due to broken crossmembers.

#### 1.C.1. Crossmember Inspection Procedure

- A. Visually and physically inspect all crossmembers, attaching hardware, and other structural supports for cracks or deformations.
- B. Inspect any area of the floor that is sagging, weak or damaged due to broken, damaged or loose crossmembers.

#### 1.D. Dimensions

- A. Interior Height

The inside body height must provide for 72 inches of headroom, measured metal to metal, at any point on the longitudinal centerline from front vertical bow to rear vertical bow. The inside body height of a Type A bus shall be 62 inches or more. Inside height measurement does not apply to air conditioning equipment.

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Inside headroom measurement should be at least 71 ¼ inches measured at the centerline of the bus. Inside headroom measurement for a Type A bus should be at least 61 ¼ inches measured at the centerline of the bus.

B. Length and Width

A school bus shall not exceed 45 feet in length, nor exceed 102 inches (8 ½ feet) in width. Accessories such as mirrors, stop-arm(s), or other non-permanent body components/accessories are not included in the dimensions requirement.

---

**1.E. Defroster/Heater Standard**

❖ [MSS 169.4501](#)

❖ [FMVSS 103](#)

- A. Defrosting and defogging equipment shall direct a sufficient flow of heated air onto the windshield, the window to the left of the driver and the glass in the viewing area directly to the right of the driver to eliminate frost, fog and snow.

Note: The requirements of this standard do not apply to the exterior surfaces of double pane storm windows.

- B. All combustion-type heaters must be approved by the Federal Motor Carrier Safety Regulations. Portable heaters are not approved as outlined in the NSTSP.
- C. If a combustion-type heater is used, only a body manufacturer may complete the installation. Existing/operational school buses may have the installation completed by an authorized dealer or garage.
- D. All forced-air heaters installed by the body manufacturers must bear a name plate that indicates the heater rating in accordance with SBMTC-001. The plate shall be affixed by the heater manufacturer and shall constitute certification that the heater performance is as shown on the plate.

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**1.E.1. Defroster Operation**

No operable defrosting and defogging system to clear the driver's windshield.

---

**1.E.2. Heater and Auxiliary Fan Operation**

Any defroster/heater fan(s); including auxiliary fan(s), that does not work on high and low speeds is a defect.

---

**1.F. Doors: Service Entrance**

- A. All Type A school buses manufactured on or after Jan. 1, 2008, and all Types B, C and D school buses shall have an entry door with a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches. Type A school buses manufactured prior to Jan. 1, 2008, shall have a minimum opening area of 1,200 square inches.
- B. Buses manufactured on or after Jan. 1, 2008 shall have a split-type door that shall open outward.
- C. School buses manufactured prior to Jan. 1, 2008 may have a split- or jackknife-type service door. If a split-type door is used, the front section must open outward.
-



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- 
- D. The primary entrance door shall be located on the right side of the school bus, opposite and within direct view of the driver.
  - E. In addition, buses may be equipped with a left-side entrance door located immediately behind the driver to be used exclusively for curbside loading/unloading on one-way streets.
  - F. Buses equipped with a left-side entrance door shall have a mirror mounted in the upper right corner of the interior of the bus so as to provide a clear view of the left side entrance door and stepwell.
  - G. The entrance door shall be under the driver's control, designed to afford easy release and to provide a positive latching device on manual operating doors to prevent accidental opening. When a hand lever is used, no part shall come together that will shear or crush fingers. Manual door controls shall not require more than 25 pounds of force to operate at any point throughout the range of operation, as tested on a 10 percent grade, both uphill and downhill (see [1.G.2, Emergency Door Requirements](#) if door is inoperable).
  - H. On power-operated entrance doors, the emergency release valve, switch or device to release the entrance door must be placed above or to the immediate left or right of the entrance door and must be clearly labeled. The emergency release valve, switch or device shall work in the absence of power (see [1.G.2, Emergency Door Requirements](#) if door is inoperable).
  - I. Vertical closing edges shall be equipped with a flexible material to protect children's fingers. Type A school buses manufactured prior to Jan. 1, 2008 may be equipped with a chassis manufacturer's standard door.
  - J. All entrance door glass shall be approved safety glass. The bottom of each lower glass panel shall not be more than 10 inches from the top surface of the bottom step. The top of each upper glass panel when viewed from the interior shall be not more than 3 inches below the interior door control cover or header pad (see [1.Y, Windows and Window Glass](#)).
  - K. School buses manufactured after Dec. 31, 1994 shall have all door openings equipped with padding at the top edge of the opening. Padding shall be at least 3 inches wide and 1 inch thick and extend the full width of the door opening.

---

## 1.F.1. Door Operation Defect(s)

- A. The student entrance door does not open or close properly;
- B. Door control handle does not lock in the closed position; or
- C. Door is equipped with a padlock or similar locking device (excludes interlock systems).

---

## 1.F.2. Other Door Defect(s)

Every motor vehicle shall at all times be equipped with such parts (i.e. gasket) and equipment so arranged and kept in such state of repair as to prevent carbon monoxide from entering the interior of the vehicle.

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## 1.G. Emergency Exits

- A. All emergency exits must meet the requirements of FMVSS 217. However, refer to the design standard (NSTSP) applicable at the time of manufacture for the required number of emergency exits.
- B. For buses manufactured on or after January 01, 2013, use the following tables to determine the required number and types of emergency exits to comply with this specification, based on the bus manufacturer's equipped seating capacity.
  1. Use **Table 1** if the bus contains a rear emergency door.
  2. Use **Table 2** if the bus contains a rear pushout emergency window AND a left side emergency door, as required by [FMVSS 217](#) for school buses without a rear emergency door.
  3. When using either Table 1 or Table 2:
    - a. Enter the table at the appropriate capacity and select the desired row from the options for that capacity.
    - b. A school bus will meet the requirements of this specification and the requirements of [FMVSS 217](#) if it contains the types and quantities of emergency exits listed on the row selected.
- C. The exposed area of the upper panel of emergency doors shall be a minimum of 400 square inches of approved safety glazing. If installed, all other glass panels on emergency doors shall be approved safety glazing.

Table 1 Buses with Rear Emergency Door (All Front Engine Buses)						Table 2 Buses with Rear Pushout Window and Left-Side Emergency Door (All Rear Engine Buses)					
Available Combination By Capacity	Manufacturers Equipped Capacity	Shall Have	And Shall Have			Available Combinations By Capacity	Manufacturers Equipped Capacity	Shall Have	And Shall Also Have		
		Roof Hatch	L. Side Emerg. Exit Windows	R. Side Emerg. Exit Windows	L. Side Emerg. Exit Door			Roof Hatch	L. Side Emerg. Exit Windows	R. Side Emerg. Windows	R. Side Emerg. Exit Door
1-45	1-45	1	0	0	0	1-45	1-45	1	0	0	0
46-77	46-77	2	1	1	0	46-89	46-89	2	1	1	0
	46-77	2	0	0	1		46-89	2	0	0	1
78-93	78-93	2	2	2	0	90-105	90-105	2	2	2	0
	78-93	2	1	1	1		90-105	2	1	1	1

### 1.G.1. Emergency Exit Identification/Lettering

- ❖ [FMVSS 217 S5.5.3](#) and [S5.5.9](#)

Each school bus emergency exit shall have the designation "Emergency Door" or "Emergency Exit," as appropriate, in letters at least 2 inches high, of a color that contrasts with its background.

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Concise operating instructions describing the motions necessary to unlatch and open the emergency exit shall be located within 6 inches of the release mechanism on the inside surface of the bus. These instructions shall be in letters at least ½ inch high and of a color that contrasts with its background.

A. Doors

For emergency exit doors, the designation shall be located at the top of, or directly above, the emergency exit door on both the inside and outside surfaces of the bus.

B. Roof Exits

The designation for roof exits shall be located on an inside surface of the exit, or within 30 centimeters of the roof exit opening.

C. Windows

For emergency window exits, the designation shall be located at the top of, or directly above, or at the bottom of the emergency window exit on both the inside and outside surfaces of the bus.

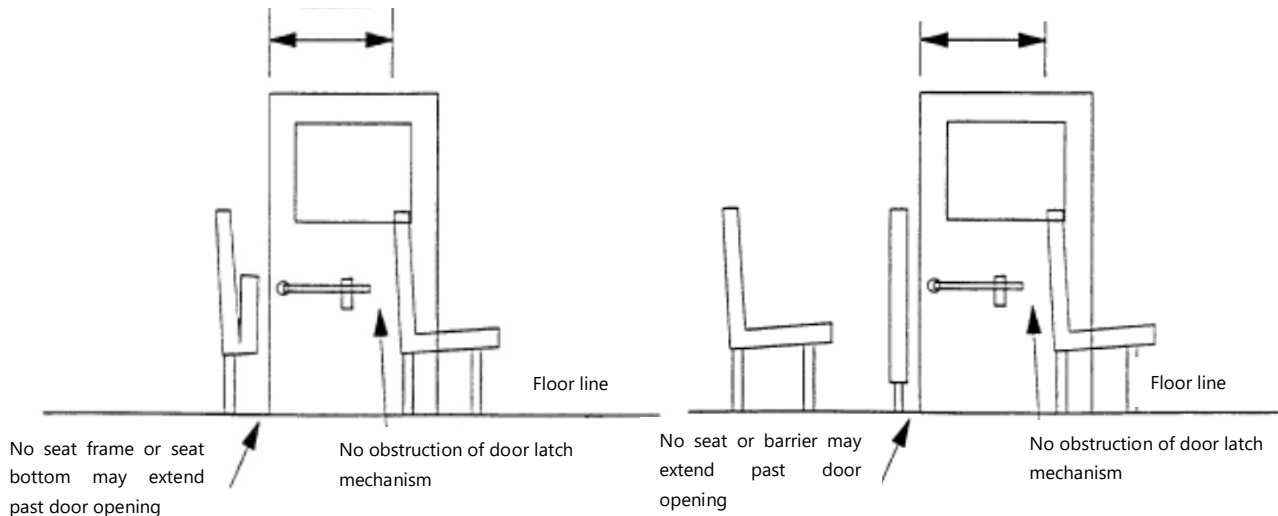
## 1.G.2. Emergency Door Requirements

❖ [FMVSS 217](#)

❖ [SBIM 1.A.](#)

A. A school bus must have a rear emergency door exit. It shall be located within the center of the rear end, or the rear half on the left side.

B. The emergency door opening must be a minimum of 24 inches wide by 45 inches high by 12 inches deep. A side emergency door must be a minimum of 24 inches wide by 45 inches high, but there must be a 12-inch aisle between the rearmost edge of the door opening and the rear surface of a seat back.



C. When opening the rear emergency door from the inside, it must open to the left. If opening a side emergency door from the inside, it must open to the right. Either emergency door must open outwardly and must have an interior label displaying operational directions.

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- D. A seat bottom may be located within the area of a side emergency exit door if the seat bottom pivots and automatically assumes and retains a vertical position when not in use – see paragraph B illustration of this section.
  - E. Each school bus emergency exit door shall allow manual release of the door by a single person, from both inside and outside the passenger compartment. The release mechanism shall operate without the use of remote controls or tools, and notwithstanding any failure of the vehicle's power system.
  - F. A latching device shall be used to hold a door open, preventing the emergency door from closing during an actual emergency or school bus evacuation drill.
    - \* Paragraph E applies to buses manufactured after Dec. 31, 1994.
  - G. When the release mechanism is not in the position that causes an emergency exit door to be closed, and the vehicle's ignition is in the "on" position, a continuous warning sound shall be audible at the driver's seating position and in the vicinity of the emergency exit door. There must be no steps leading to the emergency door.
  - H. There shall be no obstruction higher than ¼ inch across the bottom of any emergency door opening. Fasteners used within the emergency exit opening shall be free of sharp edges or burrs.
  - I. The service and emergency door may be equipped with vandal locks if they comply with [FMVSS 217](#).
  - J. Required and/or marked emergency exits must not be missing, inoperative (do not open, close and/or secure as designed), or obstructed (see also [SBIM 1.A](#)).

---

## 1.G.3. Emergency Window Requirements

- A. The rear emergency window shall have a lifting assistance device that will aid in lifting and holding the rear emergency window open.
- B. Side emergency exit windows, when installed, may be vertically hinged on the forward side of the window. No side emergency exit window will be located above a stop-arm.
- C. When a release mechanism is open and the vehicle's ignition is in the "on" position, a continuous warning shall be audible at the drivers seating position and in the vicinity of that emergency exit.
- D. Required and/or marked emergency exits must not be missing, inoperative (do not open, close and/or secure as designed), or obstructed.

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## 1.H. Firewall Openings

All openings in the floorboard or firewall between the chassis and passenger compartments, such as for gearshift lever and auxiliary brake lever, shall be sealed.

---

## 1.I. Floor Construction

- ❖ MSS [169.4501](#) and [169.4503, subdivision 7](#)
  - A. The metal floor must be covered with plywood. The plywood must be five-ply nominal 5/8 inch thick and must equal or exceed properties of exterior-type softwood plywood, grade C-D, as specified in the standard issued by the United States Department of Commerce. All of the plywood's exposed edges must be sealed. Type A-I buses must be equipped with nominal ½ inch thick plywood or an equivalent material that meets the requirements of this subdivision.
-

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Equivalent material may be used to replace plywood, provided it has insulation R-value, deterioration, sound abatement and moisture resistance properties that are equal to or exceed the properties of the plywood it is replacing. The floor must be level from front to back and side to side, except in wheel housing, toe board and driver's seat platform areas.

## Optional

The underside of the metal floor may be undercoated with a polyurethane floor insulation. This does not replace the plywood requirement.

- B. The floor in the under-seat area, including tops of wheel housings, driver's compartment and toeboard, shall be covered with an elastomer floor covering, having a minimum overall thickness of .125 (1/8) inch and a calculated burn rate of 0.1 (1/10) mm per minute or less, using the test methods, procedures and formulas listed in [FMVSS 302, Flammability of Interior Materials](#). The driver's area and toeboard area in all Type A buses may be manufacturer's standard flooring and floor covering.
- C. The floor covering in the aisles shall be ribbed or other raised pattern elastomer and have a calculated burn rate of 0.1 (1/10) mm per minute or less using the test methods, procedures and formulas listed in [FMVSS 302](#). Minimum overall thickness shall be 0.187 (3/16) inch measured from tops of ribs.
- D. The floor covering must be permanently bonded to the floor and must not crack when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be a type recommended by the manufacturer of floor-covering material. All seams shall be sealed with waterproof sealer.
- E. On Types B, C and D buses, a flush-mounted, screw-down plate that is secured and sealed shall be provided to access the diesel or gasoline fuel tank sending unit and/or fuel pump. This plate shall not be installed under flooring material.

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### **1.I.1. Floor Construction Inspection Procedure**

Visually inspect floor covering, aisle and cove molding strips for condition and adhesion. Check fastening holes for cracks, and check condition of rubber in aisle to ensure that there are no unsealed holes or cracks through the underside of the bus and that there is no damage to the coverings that could cause a trip or slip hazard.

Check for a plywood floor by opening the rear door and observing the rise in the floor area above the metal floor line. Observe levelness of the floor and covering. Seams must be sealed and the covering bonded to the floor. The floor must be covered with an elastomer floor covering. Aisle covering must also be nonskid, wear resistant and ribbed.

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### **1.J. Handrail(s)**

At least one handrail shall be installed. The handrail shall be a minimum of 1 inch diameter and be constructed from corrosion resistant material(s). The handrail(s) shall assist passengers during entry or exit and shall be designed to prevent entanglement, as evidenced by the passing of the NHTSA string and nut test.

---

### **1.K. Hazardous Protuberance/Sharp Edge(s)**

- A. The school bus exterior may not have any torn/broken parts, glass, or other loose or dislocated part(s). No part/object may protrude from the surface of the vehicle that presents a safety hazard.
-

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- B. The school bus interior may not have exposed sharp edges consisting of torn metal parts, moldings, or glass that could injure a student or tear clothing.
- 

**1.K.1. Speakers: Interior**

- ❖ MSS 169.4503, subdivision 15

Interior speakers may protrude up to ½ inch from the school bus interior.

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**1.K.2. Video or Mobile Surveillance Systems**

- ❖ [169.4503 subdivision 30](#)

Camera heads for video or mobile surveillance may be mounted in the driver compartment area, midbus, or on a rear interior bulkhead in the student passenger area. For buses manufactured or retrofitted with a surveillance system after December 31, 2012, cameras mounted midbus must be parallel to a seat back, must not have any sharp edges, must not extend outward more than 3-1/2 inches, and must be located within 24 inches of the top of the side window of the bus. The 24 inch measurement is taken from the top of the window frame and following the roof contour.

---

**1.L. Instruments and Instrument Panel**

- A. The chassis shall be equipped with the instruments and gauges listed below:

**Note:** (Telltale warning lamps in lieu of gauges are not acceptable, except as noted).

1. Brake air pressure gauge (air brakes), brake indicator lamp (vacuum/hydraulic brakes), or brake indicator lamps (hydraulic/hydraulic);
2. Fuel gauge;
3. Glow-plug/grid heater indicator (if applicable).
4. High-beam headlamp indicator;
5. Odometer that can be read without using a key and that will give accrued mileage (to seven digits), including tenths of miles, unless tenths of miles are registered on a trip odometer.
6. Oil pressure gauge.
7. Speedometer;
8. Tachometer.

**Note:** For Types B, C and D buses, a tachometer shall be installed so as to be visible to the driver while seated in a normal driving position.

The 2000 NTSTP date range — Nov. 1, 2004 through Dec. 31, 2007 — excludes school buses manufactured during these years from the tachometer requirement.

9. Turn signal indicator;
  10. Voltmeter;  
**Note:** An ammeter with graduated charge and discharge indications is permitted in lieu of a voltmeter; however, when used, the ammeter wiring must be compatible with the current flow of the system.
  11. Water temperature gauge.
-

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- B. All instruments shall be easily accessible for maintenance and repair.
  - C. The instruments and gauges shall be mounted on the instrument panel so that each is clearly visible to the driver while seated in a normal driving position.
  - D. Instruments and controls must be illuminated as required by [FMVSS 101, Controls and Displays](#).
  - E. Multi-Function Gauge (MFG)
    - 1. The driver must be able to manually select any displayable function of the gauge on an MFG, whenever desired.
    - 2. Whenever an out-of-limits condition that would be displayed on one or more functions of an MFG occurs, the MFG controller should automatically display this condition on the instrument cluster. This should be in the form of an illuminated telltale warning lamp, and the MFG should automatically display the out-of-limits indications. If two or more functions displayed on the MFG go out of limits simultaneously, the MFG should sequence automatically between those functions continuously until the conditions are corrected.
    - 3. The use of an MFG does not relieve the need for audible warning devices, where required.

---

## 1.M. Interior Cleanliness/Loose Objects

- A. The floor should be reasonably clean with no accumulation of dirt, dust and refuse. The interior shall also be free of graffiti.
- B. Essential tools necessary for cleanliness and basic cosmetic upkeep (i.e. shovel, broom, windshield washer fluid, etc.) shall be secured.
- C. A trash receptacle/container is permitted, but limited to the driver's area and secured.

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## 1.N. Metal Treatment

- A. All metal except high-grade stainless steel or aluminum used in construction of the bus body shall be zinc-coated, aluminum-coated or treated to prevent corrosion. This includes but is not limited to such items as structural members, inside and outside panels, door panels and floor sills. Excluded are such items as door handles, grab handles, interior decorative parts and other interior plated parts.
  - B. All metal parts that will be painted, in addition to the above requirements, shall be chemically cleaned, etched, zinc phosphate-coated, and zinc chromate- or epoxy-primed to improve paint adhesion. This includes, but is not limited to, such items as the crossing control arm and stop arm.
  - C. In providing for these requirements, particular attention shall be given to lapped surfaces, welded connections of structural members, cut edges on punched or drilled hole areas in sheet metal, closed or box sections, unvented or undrained areas, and surfaces subjected to abrasion during vehicle operation.
  - D. As evidence that the above requirements have been met, samples of materials and sections used in the construction of the bus body shall be subjected to a cyclic corrosion testing as outlined in SAE J1563.
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# School Bus Inspection Manual

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## 1.O. Mirrors (Exterior)

- ❖ [MSS 169.4501](#)
- ❖ [FMVSS 111](#)

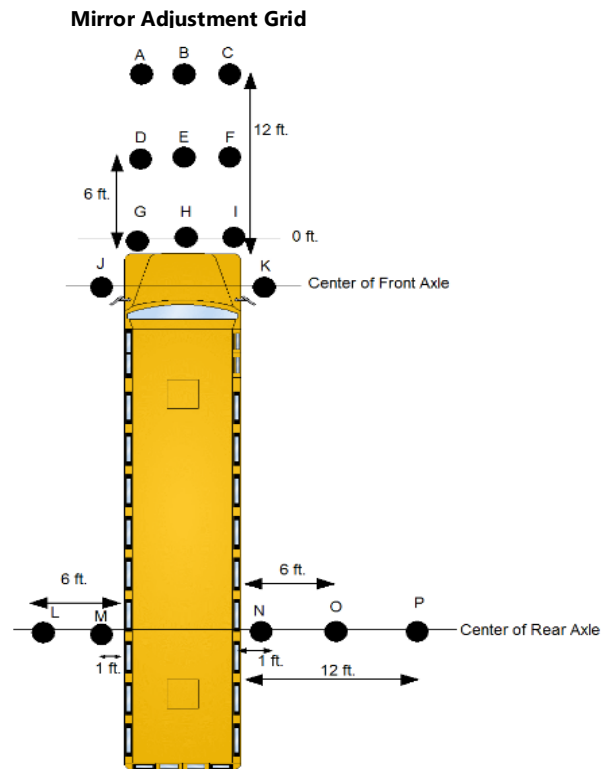
Each school bus shall be equipped with exterior mirrors meeting the requirements of [FMVSS 111, Rearview Mirrors](#). The right-side rearview mirror shall not be obscured by the unwiped portion of the windshield. Mirrors shall be easily adjustable, but shall be rigidly braced so as to reduce vibration.

[FMVSS 111](#) requires two systems of mirrors to be used on a school bus: System A and System B.

System A - There shall be one on each side of the bus. Each mirror shall have a reflective surface of at least 323 square centimeters (50.065 square inches). They shall provide a view of the rear tires and extend to a point of no less than 200 feet to the rear of the bus from the mirror surface.

System B – Each bus shall be equipped with a series of mirrors that will allow the driver to see cylinders A through P using the mirror adjustment grid.

A mirror adjustment grid is provided (Fig. 5) to assist in a visual reference related to the viewing area for each mirror.



### 1.O.1. Crossover, Convex, Flat Mirrors

- ❖ [FMVSS 111](#)

Mirrors must not be missing or inoperable, including failure to hold a set adjustment. Line of vision must not be distorted, discolored, flaking or cracked.



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## 1.P. Mirrors (Interior)

- A. The interior glass mirror shall be either laminated or tempered and shall have rounded corners and protected edges. Mirrors shall be 6 by 16 inches minimum for Type A buses and 6 by 30 inches minimum for Types C and D buses.
- B. The interior mirror must not be missing or inoperable, including failure to hold a set adjustment. Line of vision must not be distorted, discolored, flaking or cracked.

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## 1.Q. Rub Rails

- ❖ MSS [169.4501](#) and [169.4503](#)

At a minimum, three rub rails are required on Type A (excluding van conversions), B, C and D school buses.

- A. One rub rail must be installed at approximately seat level on each side of the bus. The rub rail must extend from the rear side of the entrance door completely around the bus body (except for the emergency door) to the point of curvature near the outside cowl on the left side.
- B. There must be one rub rail located approximately at the floor line that must cover the longitudinal area as the upper rub rail, except at the wheel housing, and must extend only to the radii of the right and left rear corners.
- C. One rub rail shall be installed at the base of the skirt of the bus.
- D. The rub rails must be four inches in width, be of 16-gauge steel, must be constructed of corrugated or ribbed fashion, and must be securely fastened. Pressed-in or snap-on rails will not satisfy this requirement. The rub rails adjacent to the beltline may be black or yellow. All other rub rails must be black; see [Chapter 4, Color](#).
- E. Type A Van Conversions do not need a rub rail located at the base of the skirt on the school bus.
- F. Ascertain that the rub rails are positioned as required unless extra rails are installed to further protect the bus from an impact.

---

## 1.R. Seats Standard

- ❖ MSS [169.4501](#) and [169.4503](#)

The following is applicable to buses manufactured after Dec. 31, 1994.

- A. The driver's seat shall be of a high-back type that includes a head restraint.
  - B. All seats must be forward facing.
  - C. Each seat leg shall be secured to the floor by bolts, washers and nuts in order to meet the performance requirements of [FMVSS 222](#). Flange-head nuts may be used in lieu of nuts and washers. All seat frames attached to the seat rail shall be fastened with two or more bolts, washers and nuts, or with flange-head nuts. Seats may be track-mounted in accordance with [FMVSS 222](#). A padded crash barrier meeting federal manufacturing requirements for school bus seats and crash barriers must be installed for each seating position. All crash barriers must be installed according to and conform to [FMVSS 222](#).
  - D. Seat cushions shall have a minimum depth of 15 inches. The seat backs shall have a minimum height of 20 inches for school buses manufactured prior to Jan. 1, 2013, and 24 inches for school buses manufactured on or after Jan. 1, 2013, from a seating reference point. Contact your seating manufacturer for additional information on the seating reference points.
-

# School Bus Inspection Manual

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## 1.R.1. Loose Seats (Floor Mounts)

❖ [FMVSS 207](#)

All seats shall be forward facing and anchored securely. The anchoring standard is set forth in [FMVSS 208](#).

## 1.R.2. Seat Belt (Driver)

- A. For buses manufactured before Jan. 1, 1995: A lap belt must be provided for the driver. The seat belt and its mounting must comply with [FMVSS 207 through 210](#). Each seat belt section must be bootied to keep the buckle and latch off the floor and within easy reach of the driver. The seat belt must be anchored or guided at the seat frame to prevent the driver from sliding sideways under the seat belt.
- B. For buses manufactured after Dec. 31, 1994: A Type II lap belt/shoulder harness seat belt shall be provided for the driver. The assembly shall be equipped with an emergency locking retractor (ELR). The lap belt portion shall be guided or anchored where practical to prevent the driver from sliding sideways under it.

## 1.R.3. Seat belts (Passengers)

Buses equipped with optional passenger seat belts must comply with applicable FMVSS [208-210](#), [213](#), [222](#), and [225](#).

## 1.R.4. Seat Condition/Cushion(s)

- A. Passenger seat cushions shall be fastened to prevent the cushions from disengaging from the seat frames.
- B. All restraining barriers and passenger seats shall be covered with a material that has fire retardant or fire block characteristics. Cuts, tears, or damaged seating compromises the fire block/retardant characteristic and is a defect. Additionally, every seat shall be in a state of good repair that prevents the sensation of any seat framing due to seat foam degradation.

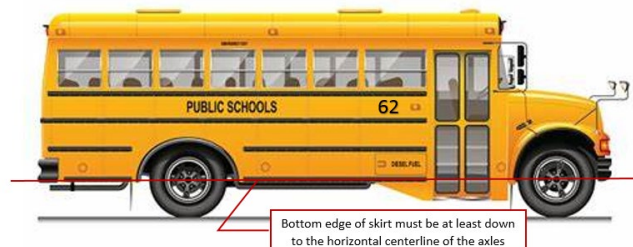
## 1.R.5. Seat Spacing

❖ [FMVSS 222 S5.2](#)

Seat spacing fails to comply with FMVSS 222.

## 1.S. Side Skirts

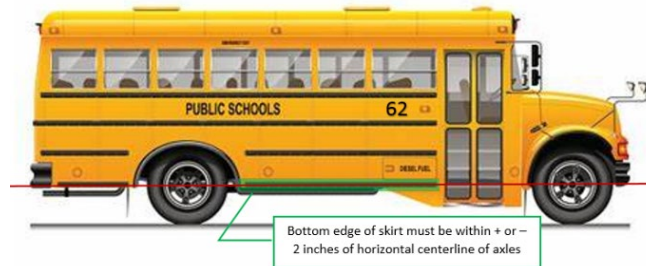
- A. Buses manufactured on or after Jan. 1, 2008 and prior to Jan. 1, 2017 (2005 NSTSP) shall have side skirts between the front and rear axles that extend down at least to the horizontal line from the center of the front spindle to the center of the rear axle. This measurement shall apply to a new unloaded school bus located on a flat level surface.



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- B. Buses manufactured on or after Jan. 1, 2017 (2015 NSTSP) shall have side skirts between the front and rear axles that extend down to within two inches plus or minus, of the horizontal line from the center of the front spindle to the center of the rear axle. The manufacturer may offer optional side skirt lengths that extend lower than this requirement. This measurement shall apply to a new unloaded school bus located on a flat, level surface.



## 1.T. Steps

- A. The first step at the service door must be not less than 10 inches and not more than 14 inches from the ground, based on standard chassis specifications. Type D vehicles' first step shall be 12 to 16 inches from the ground.
- B. Step risers shall not exceed a height of 10 inches. When a plywood floor is used on steel, the riser height may be increased by the thickness of plywood used. Steps must be enclosed to prevent accumulation of ice and snow.
- C. Steps must be enclosed and not protrude beyond the bodyline. Grooves in the covering must run perpendicular (90°) to the long dimension of the step. There must be a 1 ½ inch white nosing as an integral piece without joints.
- D. The step well or support structure should not be damaged.
- E. All steps, including the floor-line platform area, must be covered with elastomer floor covering at least 0.187 ( $\frac{3}{16}$ ) inches thick.
- F. A step covering shall be permanently bonded to a durable backing material resistant to corrosion.
- G. Steps including floor line platform shall have a 1 ½-inch white nosing as an integral piece.

### 1.T.1. Stirrup Steps

- A. There may be at least one folding stirrup step or recessed foothold and suitably located handles on each side of the front of the bus body. This is permissible for easy accessibility to clean the windshield and lamps, except when the windshield and lamps are easily accessible from the ground.
- B. Steps are permitted in or on the front bumper, in place of the stirrup steps, if the windshield and lamps are easily accessible for cleaning from that position.

### 1.U. Sun Shield

- ❖ MSS [169.4501](#) and [169.4503](#) (History: 1994 c 647 art 12 s 37)
- A. On Types B, C and D school buses, an interior adjustable transparent sun shield with a finished edge and dimensions not less than 6 by 30 inches, shall be installed in a position convenient for use by the driver.
- B. On Type A school bus, the sunshield (visor) shall be installed by the chassis manufacturer.

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## 1.V. Undercoating

The entire underside of the bus body, including floor sections, crossmembers and below floor-line side panels, shall be coated with rustproofing materials. The undercoating material shall not cover any exhaust components of the chassis.

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## 1.W. Ventilation

- ❖ MSS [169.4501](#) and [169.4503](#)
- ❖ FMVSS [217](#)

Auxiliary fans shall be placed in a location where they can be adjusted for maximum effectiveness and where they do not obstruct the driver's vision to the mirrors or interfere with the safe operation of the vehicle. Type A school buses manufactured on or after Dec. 31, 2012 may be equipped with one auxiliary fan.

Auxiliary fans shall meet the following requirements:

- A. Fans shall be 6 inches (nominal) in diameter.
- B. Fan blades shall be enclosed in a protective cage.
- C. Each fan shall be controlled by a separate switch.
- D. The bus body shall be equipped with a suitably controlled ventilating system with capacity sufficient to maintain the proper quantity of airflow under operating conditions without having to open a window except in extremely warm weather.
- E. Static-type, non-closeable exhaust ventilation shall be installed in a low-pressure area of the roof.
- F. Roof hatches designed to provide ventilation in all types of exterior weather conditions may be provided.

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## 1.X. Wheel Housing

- A. The wheel housing opening shall allow for easy tire removal and service.
- B. Wheel housings shall be attached to the floor panels in a manner that prevents any dust, water or fumes from entering the body, and shall be constructed of 16-gauge (or thicker) steel.
- C. The inside height of the wheel housings above the floor line shall not exceed 12 inches.
- D. Wheel housings shall provide clearance for installation and use of tire chains on single or dual (if so equipped) power-driving wheels.
- E. No part of a raised wheel housing shall extend into the emergency door opening.

---

## 1.Y. Windows and Window Glass (Standard)

- ❖ MSS [169.4501](#) and [169.4503](#)
- ❖ FMVSS [217](#) and [220](#)

- A. The entrance door glass and the window to the left of driver on buses manufactured after Dec. 31, 1994 shall be composed of clear glass. Approved tinted glass is permitted on all other windows as approved by [MSS 169.71](#).
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- B. The entrance door, rear emergency exit door and rear windows on buses manufactured before Jan. 1, 1995 shall be composed of a clear glass. Approved tinted glass is permitted on all other side windows. The driver's window shall be adjustable for ventilation.
  - C. Windshields, entrance and rear emergency exit doors must be composed of approved safety glass (AS1). All glass shall be federally approved and marked as provided in MSS 169.74.
  - D. The window to the left of the driver and the upper service door windows must be thermal glass. Regardless of a bus's date of manufacture, the window immediately behind the entrance door does not need to be made of thermal glass. The window to the left of the driver for Type A buses need not be thermal glass.
  - E. Each full side window must provide an unobstructed emergency opening at least 9 inches high and 22 inches wide. Obtain the measurements by lowering the window.
  - F. Laminated or tempered glass (AS2 or AS3) is permitted in all other windows as specified in ANSI Z26.1. All glass shall be federally approved and marked as provided in section MSS 169.74.
  - G. The glass interior must not be cracked, allowing passengers to feel it with their hand(s). Intersecting cracks are not allowed if the window is a thermal pane, and a passenger/driver must be able to view through it.

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## 1.Y.1. Windshield

- A. Only approved safety glass may be used. The glass shall be mounted to display the permanent glass markings, and it shall be of sufficient quality to prevent [visibility] distortion in all directions. Windshield markings must be AS1 or AS14.
- B. The windshield must not have discoloration or other damage in that portion extending upward from the height of the topmost portion of the steering wheel, but not including a 2-inch border at the top of and a 1-inch border at each side of the windshield or each panel thereof, except as follows:
  - 1. Color or tint applied by the manufacturer for the reduction of glare.
  - 2. Any crack not over  $\frac{1}{4}$  inch long, if not intersected by any other crack.
  - 3. Any damaged area that can be covered by a disc  $\frac{3}{4}$  inch in diameter if not closer than 3 inches to any other such damaged area.
  - 4. A driver's side area window(s) having chips, clouding, or cracks that obscure the driver's vision.
- C. The windshield may be of uniform tint throughout or may have a horizontal gradient band starting slightly above the line of vision and gradually decreasing in light transmission to 20 percent or less at the top of the windshield.
- D. If a windshield is replaced, a new certificate will be provided.

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## 1.Y.2. Windshield Wipers

- ❖ [MSS 169.4501](#)
  - ❖ [FMVSS 104 S.4](#)
  - A. A two-speed or variable speed windshield wiping system, with an intermittent feature, shall be provided and shall be operated by a single switch.
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- B. The wipers shall meet the requirements of [FMVSS 104, Windshield Wiping and Washing Systems](#).
    - 1. One frequency or speed shall be at least 45 cycles per minute regardless of engine load and engine speed, and the lower frequency or speed shall be at least 20 cycles per minute regardless of engine load and engine speed.
  - C. A wiper blade shall not be bent, torn, broken, or have other defects that impair the wiper's ability to effectively clear the windshield of rain, snow or other forms of moisture.

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## 1.Y.3. Windshield Washer System

A windshield washer system shall be provided, and it must be kept in good working condition. An empty washer fluid reservoir shall be deemed inoperative.

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## 1.Z. Wiring

### ❖ [MSS 169.4503](#)

- A. A master switch may be installed on any Type A, B, C, or D school bus. If a master switch is installed, any portion of the brake system that relies on electrical current for operation shall not be wired through the same switch.
  - B. All wiring shall conform to current applicable recommended practices of the SAE.
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## 2. Brakes

### Item/Method of Inspection

#### 2.A. Brakes: General

- ❖ [MSS 169.4502 subdivision 2](#)
- A. The chassis brake system shall conform to the provisions of FMVSS [105, Hydraulic and Electric Brake Systems](#); [106, Brake Hoses](#); and [121, Air Brake Systems](#) as applicable. All buses shall have either a parking pawl in the transmission or a park brake interlock that requires the driver to apply the service brake to allow release of the parking brake.
- B. The anti-lock brake system (ABS), provided in accordance with FMVSS [105, Hydraulic and Electric Brake Systems](#) or [121, Air Brake Systems](#), shall provide wheel speed sensors for each front wheel and for each wheel on at least one rear axle. The system shall provide anti-lock braking performance for each wheel equipped with sensors (four channel system). The ABS malfunction indicator light must function as designed on all ABS required vehicles.
- C. All brake systems shall be designed to permit visual inspection of brake lining wear without removal of any chassis component(s).
- D. The brake lines, booster-assist lines and control cables shall be protected from excessive heat, vibration and corrosion and installed in a manner that prevents chafing.
- E. The parking brake system for either air or hydraulic service brake systems may be of a power-assisted design. The power parking brake actuator should be a device located on the instrument panel within reach of a seated fifth-percentile female driver. As an option, the parking brake may be set by placing the automatic transmission shift control mechanism in the "park" position.
- F. The power-operated parking brake system may be interlocked to the engine key switch. Once the parking brake has been set and the ignition switch turned to the "off" position, the parking brake cannot be released until the key switch is turned back to the "on" position.
- G. Brake systems shall have no loose, broken, or missing components.

#### 2.B. Brakes: Air (Design Standard)

- ❖ [MSS 169.4501](#) and [169.4502 subdivision 2](#)
- ❖ [FMVSS 121](#)
- A. The air pressure supply system shall include a desiccant-type air dryer installed according to the manufacturer's recommendations. The air pressure storage tank system may incorporate an automatic drain valve.
- B. The chassis manufacturer shall provide an accessory outlet for air-operated systems installed by the body manufacturer. This outlet shall include a pressure protection valve to prevent loss of air pressure in the service brake reservoir.
- C. For air brake systems, an air pressure gauge shall be provided in the instrument panel capable of complying with commercial driver's license (CDL) pre-trip inspection requirements.
- D. Air brake systems shall include a system for anti-compounding of the service brakes and parking brakes.

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- E. Air brakes shall have both a visible and audible warning device whenever the air pressure falls below the level where warnings are required under [FMVSS 121, Air Brake Systems](#).
  - F. Visually inspect all brake chambers to ensure they are properly marked, in good operating condition, have no visible damage and are properly matched. Chambers must be matched by size, type and stroke.

---

## 2.B.1. Air Brake Components

- A. A school bus shall not have any air brake parts such as air lines, air reservoirs (tanks), valves, fittings, air brake chambers, governors or slack adjusters that are leaking, cracked, missing, inoperative, out of adjustment, loose, worn, broken, improperly secured or retained, inadequate, or any other condition or defect likely to reduce the efficiency of the brake system.
- B. Visually inspect all brake chambers to ensure they are properly marked, in good operating condition, have no visible damage and are properly matched. Chambers must be matched by size, type and stroke.
- C. Each school bus (if applicable) must have an air compressor of sufficient capacity to increase air pressure in the supply and service reservoirs from 85 pounds per square inch (psi) to 100 psi within a reasonable amount of time, i.e. 3 to 4 minutes, for maximum (actual reservoir capacity x25) required reservoir capacity.
- D. Each school bus with compressed-air service brakes shall have a signal other than a pressure gauge that gives a continuous warning to a person in a normal driving position when the ignition is in the "on" or "run" position and the air pressure in the service reservoir system is below 60 psi. The signal shall be either a red light visible within the driver's forward field of view or both audible and visible to the driver as specified in [FMVSS 101](#).
- E. Each school bus with a compressed air service brake system shall have an illuminated pressure gauge for each service brake reservoir system, readily visible to a person in the normal driving position that indicates the service reservoir system air pressure. The accuracy of the gauge shall be within +/- 7 percent of the compressor cutout pressure – [FMVSS 121](#).

### Air Brake Reservoir

- ❖ [MSS 169.4502](#)
  - ❖ [FMVSS 101 through 121](#)
  - F. Each service brake system shall be protected against loss of pressure due to failure or leakage in the system between the service reservoir and the source of the pressure, by check valves or equivalent devices whose proper functioning can be checked without disconnecting any air line or fitting.
  - G. Each reservoir shall have a condensation drain valve that can be operated manually.
  - H. Each school bus with compressed air service brakes shall have at least two reservoirs or one vessel divided into two compartments connected in a series.
  - I. Lines supplying air to the air system reservoirs shall be safeguarded through proper design and bracing to protect from excessive heat or vibration.
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- J. The first reservoir of every air brake system shall have mounted on it a safety valve to protect against excessive air brake system pressure.

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## 2.B.2. Vacuum Actuated and Compressed Air Over Hydraulic

- ❖ [FMVSS 105 through 121](#)

The requirements contained within this subchapter are specific for vacuum actuated and compressed air over hydraulic systems.

- A. Buses having vacuum actuated or compressed air over hydraulic systems shall be equipped with check valves located between the supply source and the reservoir.
- B. Buses with service brakes activated or assisted by air or vacuum must, with one such unit inoperative and depleted of all reserve capability, be capable of stopping the vehicle from 60 mph within the corresponding distance specified in Column IV of Table II of [FMVSS 105 subpart 5.1.3.1a](#).
- C. Buses with service brakes assisted by compressed air must have a low air warning device that conforms to [FMVSS 121](#).
- D. Buses with service brakes assisted by vacuum must be equipped with a device that provides a readily audible or visible continuous warning to the driver whenever the vacuum in the vehicle's supply reservoir is less than 8 inches of mercury and with a vacuum gauge that indicates to the driver the vacuum in inches of mercury available for braking.

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## 2.B.3. Air Brake Hoses and Tubing

- ❖ [MSS 169.4501](#)
- ❖ [FMVSS 106](#)

- A. Carefully perform a visual inspection of all system hoses, lines and tubing.
- B. Hoses, lines and tubing shall not leak, nor have any bulging or swelling when the system is pressurized. A hose, line or tubing shall not be cracked, broken or crimped in such a manner as to restrict flow; any hose abraded (chafed) through the outer cover to the fabric layer or any line/tubing; and for proper securement and support.

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## 2.B.4. Air Brake Inspection Procedure

### Air System

With full system air pressure, depress the brake pedal and inspect each wheel-end brake to determine if effective braking forces are applied to each wheel-end brake. There should be no audible air loss at supply lines, fittings, valves or brake chambers.

With full system pressure, make a single full service brake application with the parking brake and ignition off. Note the gauges and listen for air leaks. Release the service brake.

If an air leak is detected at any point in the inspection process, the inspector should check the vehicle's air loss rate following these procedures:

1. Set engine at idle and release brakes.
  2. Reduce air pressure in reservoir to 80 psi.
  3. Make a full brake application with governor cut-in.
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4. Check air pressure gauge after initial application for air loss. Air pressure should be maintained or increase. A drop in pressure indicates a serious air leak in the brake system.

## Air Brake Measurements

The following procedure is based on the applied stroke method for measuring the movement of the brake chamber push rod:

1. Release the spring brakes and visually check each brake to ensure that it is in the normal released position.
2. With the brakes released, make a mark where the pushrod exits the brake chamber.
3. With the engine off, make a series of brake applications to reduce the reservoir pressure to between 90 and 100 psi.
4. Apply and hold a full brake application (90 to 100 psi).
5. Measure the distance between the mark and the face of the brake chamber. The difference between measurements is called the chamber-applied stroke.

**Note:** Any brake that is beyond the re-adjustment limit will require repairs and/or adjustment. (See Table 3 and 4: Brake Adjustment Specifications below.)

Table 3 Clamp Type Chamber Data			
Type	Rated Stroke Marking	Outside Diameter	Brake Adjustment Limit
6	A	4 1/2	1 1/4
9	B	5 1/4	1 3/8
12	B	5 11/16	1 3/8
16	D	6 3/8	1 3/4
20	D	6 25/32	1 3/4
24	D	7 7/32	1 3/4
30	E	8 3/32	2
36		9	2 1/4

Table 4 "Long Stroke" Clamp Type Brake Chamber Data			
Type	Rated Stroke Marking	Outside Diameter	Brake Adjustment Limit
12	D	5 11/16	1 3/4
16	E	6 3/8	2
20 (2 1/2" rated stroke)	E	6 25/32	2
20 (3" rated stroke)	F	6 25/32	2 1/2
24 (2 1/2" rated stroke)	E	7 7/32	2
24 (3" rated stroke)	F	7 7/32	2 1/2
30	F	8 3/32	2 1/2

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## Slack Adjuster Length

Measure from the center of the S-cam to the center of the push rod clevis pin. All slack adjusters on a single axle shall be of the same type and length.

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## **2.C. Brakes: Hydraulic**

Buses using hydraulic-assist brakes shall meet requirements of [FMVSS 105](#). It includes the hydraulic portion of the vacuum actuated and compressed air over hydraulic systems.

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### **2.C.1. Brake Hoses and Tubing**

- A. A school bus shall have no hydraulic hoses, tubing, valves or connections that are cracked, chafed, or improperly retained or supported to prevent damage by heat, vibration or abrasion by contact with the frame axle, other lines or any other part of the vehicle. Brake hoses and tubing must conform to [FMVSS 106](#).
- B. A school bus shall have no hydraulic hoses, tubing, valves or connections that are leaking, restricted, pinched, broken, missing, or flattened.

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### **2.C.2. Master Cylinder**

- A. A master cylinder shall have a reservoir compartment for each service brake subsystem serviced by the master cylinder. Loss of fluid from one compartment shall not result in a complete loss of fluid from another compartment.
  - \* See [FMVSS 105 subpart 5.4](#) for further information.
- B. The master cylinder, wheel cylinder, caliper, assistor pump, assistor pump gear, belts or pulleys shall be free of cracks, leaks, wear, or damage, and they shall be securely mounted and properly adjusted.
- C. A master cylinder and assistor reservoir shall be full of fluid above the safe level recommended by the manufacturer for all compartments of the fluid reservoir.

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### **2.C.3. Power Assist**

The power assist must operate as designed.

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### **2.C.4. Warning Device**

A school bus with a hydraulic service brake system or a hydraulic-assistor type over hydraulic service brake system must be equipped with a signal that provides a warning to the driver when a failure in the brake system occurs. The warning device shall be mounted in front of, and in clear view of, the driver and shall conform to [FMVSS 105 subpart 5.3](#) and [FMVSS 101](#).

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### **2.C.5. Hydraulic System Inspection Procedure**

#### Hydraulic Brake System

- A. With the engine off, turn the ignition switch to the "on" position and check the instrument panel for visible and audible warning signals to indicate system malfunction. If bus is equipped with vacuum assist, it shall have a visible warning signal and gauge to indicate any loss of vacuum. Audible signals must be loud enough to be heard over engine noise.
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- B. Visually inspect the master cylinder to determine if it is below the minimum fill requirements, leaking, loose or improperly mounted.
  - C. Visually inspect the hydraulic fluid reservoir level in the master cylinder unit. Inspect for any fluid leaks on wheel cylinders/calipers, master cylinders, hose connections and vacuum booster on buses using vacuum-assisted brakes. Check for brake fluid around the brake booster between the booster and firewall.

## Pedal Reserve

- D. With the brake pedal in the full upright position, measure the distance between the brake pedal and the floor or firewall. With the engine running, make a single firm brake application and measure the distance between the brake pedal and the floor or firewall a second time. Record the difference.
- E. With vehicle stopped and engine running, depress the brake pedal. The system must be able to maintain brake pedal height under moderate foot force (40-60 pounds) for one minute without pumping. With the vehicle in the stopped position and the brake pedal depressed under moderate foot force (40-60 pounds), there should be a minimum of  $\frac{1}{3}$  of the total available pedal travel (manufacturer's specification) remaining on non-powered systems.

## Power Assist

- F. Electric/hydraulic assist: With engine off, depress the brake pedal. The electric/hydraulic brake assist motor must operate.
- G. Vacuum assist: With engine off, pump the brakes to exhaust all reserve. Hold firm pressure on the brake pedal and start the engine. The pedal should fall slightly. Failure of the pedal to fall slightly indicates a malfunction of the power assist unit.
- H. Hydro-boost: After two or three brake applications with the engine off, start the vehicle while maintaining pressure on the brake pedal. The pedal should push briefly, and then fall as the power assist engages.

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## **2.D. Brake Shoe/Pad/Lining**

The brake lining must be adequate in thickness, means of attachment and physical characteristics to provide for safe and reliable stopping of the vehicle.

- A. Visually inspect all brake linings/shoes/pads. Linings may be checked through inspection slots. All shoes/pads/linings shall comply with the applicable standards.
  - B. The brake lining/pad thickness shall not be less than  $\frac{3}{16}$  inch at the shoe center for a shoe with a continuous strip of lining, less than  $\frac{1}{4}$  inch at the shoe center for a shoe with two pads, or worn to the wear indicator if the lining is so marked for air drum brakes.
  - C. The brake lining/pad thickness shall not be less than  $\frac{1}{8}$  inch for air disc brakes, or  $\frac{1}{16}$  inch or less for hydraulic disc brakes.
  - D. Visually inspect the brake lining/pad to ensure that it is firmly attached to the shoe, is not cracked or broken, and that the friction surface is not saturated with oil, grease, or brake fluid.
  - E. Visually inspect all brake component mounting hardware for any loose, cracked, broken or missing items. This inspection should be performed both with the brakes released and with
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the brakes applied. It may be necessary to remove inspection access covers or brake dust covers or, in some instances, pull wheels and drums to accomplish the inspection.

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## 2.E. Drums/Rotors

A school bus shall not have brake drums or rotors worn or ground past the minimum safe thickness recommended by the manufacturer. Brake drums and rotors shall not be cracked, broken, missing, or have loose or elongated mounting holes, or be contaminated with grease or oil.

- A. Visually inspect all brake drums/rotors for any external cracks that open when brakes are applied. (Do not confuse short hairline internal check cracks with flexural cracks.)
- B. Inspect for any portion of the drum/rotor missing or in danger of falling away.

**Note:** It may be necessary to remove inspection access covers, brake dust covers or, in some instances, pull wheels and drums to accomplish the inspection.

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## 2.F. Parking/Emergency Brake System

- ❖ MSS [169.67 subdivision 1](#), [169.4501](#) and [169.4502 subdivision 2](#)
- ❖ FMVSS [105](#) and [121](#)

- A. Every motor vehicle, other than a motorcycle, when operated upon a highway, shall be equipped with brakes adequate to control the movement of and to stop and hold such vehicle, including two separate means of applying the brakes, each of which means shall be effective to apply the brakes to at least two wheels. If these two separate means of applying the brakes are connected in any way, they shall be so constructed that failure of any one part of the operating mechanism shall not leave the motor vehicle without brakes on at least two wheels – [169.67, subdivision 1](#).

The braking system must meet federal motor vehicle safety standards in effect at the time of manufacture – [169.4502, subdivision 2](#).

The parking brake system on a school bus with a GVWR of 10,000 lbs. or less, shall be capable of holding the vehicle stationary (to the limit of traction on the braked wheels) for 5 minutes in both forward and reverse directions on a 30-percent grade free from snow, ice and loose material.

The parking brake system on a school bus with a GVWR of 10,000 lbs. or more, shall be capable of holding the vehicle stationary for 5 minutes, in both forward and reverse positions, on a 20-percent grade free from snow, ice and loose material.

- B. A control by which the driver applies the emergency brake system must be located so the driver can readily operate it while properly restrained by a seat-belt assembly provided for the driver's use.

The parking brake shall be equipped with a warning light readily visible to the driver in a normal driving position and be marked in accordance with [FMVSS 101](#).

- C. A school bus must have either emergency features in the service brake system or a system separate from the service brake system.
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## 2.G. Brake Tests

### Compressed Air System

Test Procedure	Items Tested During the Procedure
<p><b>Note:</b> Chock the wheels before you begin.</p> <ol style="list-style-type: none"> <li>1. Start the engine to build up the air supply in the air tanks to at least 100 psi.</li> <li>2. Stop the engine, turn the key to "on" position, and make a full brake application. Pressure loss shall not exceed 3 pounds per minute.</li> <li>3. Drain the air tanks by making a series of brake applications. As you deplete the air supply in the tanks, watch the emergency brake button and the air gauge. The spring brakes must apply before the air supply is depleted. The spring brakes should set between 20 and 45 psi.</li> <li>4. Start the engine to build air press in the air tanks. The audible and/or visual warning device should turn off at 60 psi or half the governor cutout pressure. Additionally, check the air buildup time – refer to <a href="#">FMVSS 121 subpart 5.1.1</a>.</li> </ol>	<ul style="list-style-type: none"> <li>✓ Air gauge.</li> <li>✓ Supply pressure.</li> <li>✓ Air loss.</li> <li>✓ Reservoir drain valves.</li> <li>✓ Low air warning device turns on.</li> <li>✓ Reservoir check valves.</li> <li>✓ Emergency brake button.</li> <li>✓ Emergency brakes apply.</li> <li>✓ Low air warning device turns off.</li> <li>✓ Air compressor – air pressure buildup time.</li> </ul>

### Parking Brake

Test Procedure	
<ol style="list-style-type: none"> <li>1. Stop the vehicle and set the parking brake.</li> <li>2. With the engine operating and the park brakes set, place the transmission in both forward and reverse gears to determine if the brakes will hold the vehicle stationary.</li> <li>3. Visually and physically check condition of parking brake system and parking brake warning light.</li> </ol>	<ul style="list-style-type: none"> <li>✓ If the bus remains stationary, the parking brake system is functioning correctly.</li> <li>✓ If the bus does not remain stationary, the parking brake is not functioning properly and needs to be repaired/inspected further.</li> </ul>

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## Stopping Distance

### Test Procedure

- A. The foot or service brakes must, at all times, be capable of stopping the complete unit (i.e. the wet chassis weight, plus body weight, plus driver's weight, without pupils) from a speed of 20 miles per hour in not more than 25 feet for a Type A school bus and not more than 35 feet for a Type B, C, or D school bus.
- B. Measure this distance from a point at which movement of brake pedal or control begins. The school bus must stay in a 12-foot-wide lane during the test (see Appendix A for additional details).
- C. Perform the test on a substantially level – not to exceed +/- 1 percent grade – dry, smooth, hard surface that is free of loose material.

Driving the bus: During any stopping, the test must be completed by an employee of the school district or bus contractor.

## Vacuum Booster System

### Test Procedure

### Items Tested During the Procedure

- |   |   |
|---|---|
| 1. Start the engine to build up a vacuum supply.  | ✓ Vacuum gauge.   |
| 2. Stop the engine and turn the key to the "on" position, fully depressing the brake pedal. The vacuum supply must not be depleted by more than 70 percent of that vacuum as indicated by the gauge immediately before the brake application.   | ✓ Reservoir supply vacuum.                                |
| 3. Depress the brake pedal several times to eliminate all vacuum from the system; the low vacuum indicator should come on when the reservoir has less than 8 inches of mercury as shown on the vehicle's vacuum gauge.  | ✓ Vacuum loss.<br><br>✓ Low vacuum indicator comes on.    |
| 4. Depress the brake pedal with 25 to 30 foot-pounds of force on the brake pedal. Start the engine and feel for a slight movement of the brake pedal when the engine starts. If movement is absent, the booster system is inoperable. The low vacuum indicator should turn off after 8 inches of mercury is achieved. | ✓ Vacuum booster.<br><br>✓ Low vacuum indicator goes out. |

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## 3. Chassis

### Item/Method of Inspection

#### 3.A. Body Mounting

- A. The rear body crossmember shall be supported by the chassis frame. Except where chassis components interfere, the bus body shall be attached to the chassis frame at each main floor sill in such a manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.
- B. Isolators shall be installed at all contact points between the body and the chassis frame on Types A-2, B, C and D buses, and shall be secured by a positive means to the chassis frame or body to prevent shifting, separation, or displacement of the isolators under severe operating conditions.
- C. All openings in the floorboard or firewall between the chassis and the passenger compartment (e.g., for gearshift selector and parking brakes lever) shall be sealed.

#### 3.B. Bumpers

Front and rear bumpers are required.

#### 3.C. Differential

The differential housing shall not be cracked or leaking.

#### 3.D. Driveshaft

- A. Universal joints must not be worn or faulty, or have any obvious welded repairs.
- B. The center (carrier) bearing and bracket shall not be cracked, loose, worn, causing movement of more than ½ inch.
- C. The driveshaft must be protected by adequate metal guard(s). There should be a guard for each section of the drive shaft.

#### 3.E. Electrical System

- ❖ [MSS 169.4501 through 169.4503](#) (statute historical file)

The storage battery, as established by the manufacturer's rating, must be of sufficient capacity for starting and operating lighting, signal devices, heating and other electrical equipment. Attempt to verify the battery size in addition to any options.

#### 3.E.1. Buses Manufactured Before July 1, 1989

- A. No bus shall be equipped with a battery system of less than 150 ampere hours at 12 volts, measured at a 20 hour rate (negative ground system only).
- B. A battery system of at least 90 ampere hours may be installed in the engine compartment and must be used only in combination with a generator or alternator of at least 120 amperes.
- C. When a battery is to be mounted outside the engine compartment, it may be temporarily mounted to the chassis. The body company will permanently mount the battery on a sliding tray located so the battery centerline is 52 inches to the rear of the cowl. The chassis manufacturer must provide one-piece, one-gauge battery cables. The



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cables should be at least 36 inches longer than normally required to accommodate the battery when it is located 52 inches to the rear of the cowl.

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## **3.E.2. Buses Manufactured After July 1, 1989 and Before Jan. 1, 1995**

- A. Must have an alternator capable of delivering a 100 ampere output with a minimum charging rate of 30 amperes at idle.
- B. Alternator belts
  - 1. Shall not be damaged or broken.
  - 2. A wide, single serpentine belt with longitudinal multi-grooves is required unless the bus was equipped with a dual belt system.
- C. Battery
  - 1. When a battery is mounted on a sliding tray rather than the standard installation provided by the chassis manufacturer, the final location of the battery and the appropriate cable lengths shall agree with the NSTSP Design Objectives – Jan. 1985 edition.
  - 2. A school bus with a diesel-powered chassis the battery or batteries must provide a minimum of 1,070 cold cranking amperes (CCA).
  - 3. A school bus with a gas-powered chassis, the battery or batteries must provide a minimum of 800 CCA.
    - a. A bus with a GVWR greater than 10,000 pounds but less than 15,000 pounds may be equipped with a battery to provide a minimum of 475 CCA if used only in combination with an alternator of at least 80 amperes.
    - b. It is optional to use a 550 CCA battery installed in the engine compartment if the battery is used in combination with a generator or alternator of at least 120 amperes.

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## **3.E.3. Buses Manufactured After Dec. 31, 1994 through June 30, 2017**

- A. Alternator
    - 1. Type A-2 and Type B school buses with a GVWR greater than 15,000 pounds and all Types C and D buses shall be equipped with a heavy-duty truck- or bus-type alternator meeting SAE J180; having a minimum output of 100 amperes or higher, and should produce a minimum current output of 50 percent of the rating at engine idle speed.
    - 2. Alternator belts shall not be damaged or broken.
    - 3. The bus must be capable of providing enough current at 1400 revolutions per minute (RPM) to provide a positive charge to the battery with 80 percent maximum load with all lights and accessories on.
    - 4. Types A and B buses with a GVWR of 15,000 pounds or less equipped with electrical lifts shall have a minimum of 100 ampere alternator.
  - B. Battery
    - 1. For a school bus with a diesel-powered chassis, the battery or batteries must provide a minimum of 1,050 CCA.
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2. For a school bus with a gas-powered chassis, the battery or batteries must provide a minimum of 800 CCA.
- C. Optional Battery Size
1. For a bus with a GVWR of 15,000 pounds or less, a battery with a minimum of 550 CCA may be used only in conjunction with an alternator of 130 amperes. This does not apply to buses with a diesel engine or wheelchair lift.
  2. For Type C buses powered by other than diesel fuel, a battery providing at least 550 CCA installed in the engine compartment may be used only in combination with an alternator of 120 amperes.
- 

## 3.E.4. Buses Manufactured On or After July 1, 2018

### A. Alternator

1. Types A and B buses with a GVWR of 15,000 pounds or less shall have a minimum 130-amp alternator. Buses equipped with an electrically powered wheelchair lift and/or air conditioning shall be equipped with the highest rated capacity available from the chassis original equipment manufacturer (OEM).
2. All buses with a GVWR greater than 15,000 pounds shall be equipped with a heavy-duty truck- or bus-type alternator having a minimum output rating of 200 amps or higher, and should produce a minimum current output of 50 percent of the rating at engine idle.
3. All other buses than those described in paragraph A.1. of this section, equipped with an electrically powered wheelchair lift and/or air conditioning, shall have a minimum alternator output of 240 amps and may be equipped with a device that advances the engine idle speed when the voltage drops to, or below, a preset level.
4. A belt-driven alternator shall be capable of handling the rated capacity of the alternator with no detrimental effect on any other driven components.
  - To estimate the required alternator capacity, see School Bus Manufacturers Technical Council's publication, "School Bus Technical Reference," available at <http://www.nasdpts.org>.
5. A direct/gear-drive alternator is permissible in lieu of a belt-driven alternator.

### B. Battery

1. The storage batteries shall have minimum cold cranking capacity rating (cold cranking amps) equal to the cranking current required for 30 seconds at 0 degrees Fahrenheit and a minimum reserve capacity rating of 120 minutes at 25 amps. Higher capacities may be required, depending upon optional equipment and local environmental conditions.
  2. The storage batteries shall have minimum cold cranking capacity rating (cold cranking amps) equal to the cranking current required for 30 seconds at 0 degrees Fahrenheit and a minimum reserve capacity rating of 120 minutes at 25 amps. Higher capacities may be required, depending on optional equipment and local environmental conditions.
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The manufacturer shall securely attach the battery on a slide-out or swingout tray in a closed, vented compartment in the body skirt or chassis frame so that the battery is accessible for convenient servicing from the outside.

When in the stored position, the tray shall be retained by a securing mechanism capable of holding the battery tray in position when subjected to a 5g load from any direction.

The battery compartment door or cover, if separate from the tray, shall be hinged at the front or top. It shall be secured by a positive operated latching system or other type fastener. The door may be an integral part of the battery slide tray. The door or cover must fit tightly to the body and not present sharp edges or snagging points.

Battery cables shall meet SAE requirements. Battery cables shall be of sufficient length to allow the battery tray to fully extend. Any chassis frame-mounted batteries shall be relocated to a battery compartment on Type A buses.

3. Buses may be equipped with a battery shutoff switch. The switch is to be placed in a location not readily accessible to the driver or passengers.

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## 3.E.5. Electrical Components

Materials in all electrical components shall not contain mercury.

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## 3.E.6. Wiring

All wiring shall conform to current applicable recommended practices of the SAE, and a wiring diagram must be provided and made available.

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## 3.E.7. Electrical System Inspection Procedure

### Battery

- A. Visually and physically inspect the batteries to determine that they are securely mounted and there are no signs of leaking or excessive corrosion.
- B. Crank the engine to ensure there is adequate battery capacity to start the engine.

### Cables and Wiring

- C. Visually inspect all electrical cabling and wiring for chafed, frayed, damaged or burnt insulation.
  - D. Visually and physically inspect for corroded or loose connections at the battery terminals. Inspect for unsuitable insulation to electrical cabling.
  - E. Inspect for missing or damaged protective grommets insulating all electrical cables through metal compartment panels. All electrical cabling passing through a metal surface shall pass through an insulated grommet as to provide adequate protection against chafing and shorting.
  - F. Visually and physically inspect for any broken or unsecured mounting of electrical components.
  - G. Visually and physically inspect electrical cabling for securement, routing or any unsecured wiring that may cause chafing or frayed conditions.
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## 3.F. Engine

Inspect for any critical component that fails to function as designed or any fluid leak that would affect the safe operation of the vehicle.

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### 3.F.1. Engine Inspection Procedure

- A. Visually inspect engine and surrounding components for evidence of fluid leaks and loose or damaged components. Inspector shall start engine. While engine is operating, inspector shall visually and audibly monitor engine for proper operation, leaks and unusual noises of engine or components.
- B. Inspect cooling fan per manufacturer's recommendations.
- C. Visually and physically inspect all drive belts for proper alignment and tension per manufacturer's recommendations. All belts shall be free of cracking, frays, fluid, glazing and excessive wear. Inspect belt-tensioner per manufacturer's recommendations.
- D. Visually inspect all hydraulic, coolant, fuel and pneumatic hoses for damage, proper routing, proper type and proper securement. Hoses shall be routed in such a way as to avoid contact with exhaust, rotating or moving engine components or sharp edges. Hoses shall not be cracked, leaking, swollen or chaffed.

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## 3.G. Exhaust System

- ❖ A pipe with any of the defects noted in Section 3.E. would cause it to be considered inadequate.
- A. The exhaust pipe, after-treatment system and tailpipe shall be outside the bus body compartment and attached to the chassis so no other chassis component is damaged.
  - B. The tailpipe and after-treatment system shall be constructed of a corrosion-resistant tubing material at least equal in strength and durability to 16-gauge steel tubing of equal diameter.
  - C. The tailpipe may be flush with, or shall not extend more than 2 inches beyond, the perimeter of the body for side-exit pipe or the bumper for rear-exit pipe. The exhaust system shall be designed such that exhaust gas will not be trapped under the body of the bus.
  - D. The tailpipe shall exit to the left or right of the emergency exit door in the rear of the vehicle or to the left side of the bus in front of or behind the rear drive axle, or the tailpipe may extend through the bumper. The tailpipe exit location on all Type A-1 or B-1 buses may be in accordance to the manufacturer's standards. The tailpipe shall not exit beneath any fuel filler location, emergency door or lift door.
  - E. The exhaust system shall be insulated in a manner that prevents any damage to any fuel system component.
  - F. The design of the after-treatment systems shall not allow active (non-manual) regeneration of the particulate filter during the loading and unloading of passengers. Manual regeneration systems must be designed such that unintentional operation will not occur.
  - G. For after-treatment systems that require Diesel Exhaust Fluid (DEF) to meet federally mandated emissions:
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1. The composition of Diesel Exhaust Fluid (DEF) must comply with [International Standard ISO 22241-1](#). Refer to the engine manufacturer for any additional DEF requirements.
2. The DEF supply tank shall be sized to meet a minimum ratio of three diesel fills to one DEF fill.

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### 3.G.1. Exhaust Leak

A school bus must be equipped with such parts and equipment so arranged and kept in a state of repair as to prevent carbon monoxide or exhaust from entering the interior of the bus.

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### 3.G.2. Muffler

Every motor vehicle shall at all times be equipped with a muffler in good working order that blends the exhaust noise into the overall vehicle noise and is in constant operation to prevent excessive or unusual noise, and no person shall use a muffler cutout, bypass or similar device on a motor vehicle on a street or highway. The exhaust system shall not emit or produce a sharp popping or cracking sound.

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### 3.G.3. Exhaust System Inspection Procedure

- A. Visually and audibly inspect the complete exhaust system, including muffler, diesel particulate filter (DPF) and diesel oxidation catalyst (DOC), for leaks, restrictions and damage and to ensure that exhaust is not discharging directly below the driver or passenger compartment. All exhaust emission control devices shall be installed and operating per the manufacturer's recommendations.
- B. Inspect for the presence and condition of heat shielding over and around all piping, and components where specified by vehicle manufacturer.
- C. Visually and physically inspect all exhaust system mounting hardware for loose, missing or damaged components and secure attachment. Inspect to ensure all clamps are in place and secure.
- D. Visually inspect exhaust system for indications of, and areas likely to result in, burning, charring or damaging the electrical wiring, the fuel supply, or any combustible part of the vehicle.

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### 3.H. Fenders (Front)

- A. When measured at the fender line, the total spread of the outer edges of front fenders shall exceed the total spread of front tires when front wheels are in a straight-ahead position.
- B. Front fenders shall be properly braced and shall not require attachment to any part of the body.

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### 3.I. Frame

- A. Frame lengths shall be established in accordance with the design criteria for the complete vehicle.
  - B. Making holes in top or bottom flanges or side units of the frame and welding to the frame shall not be permitted except as provided or accepted by the chassis manufacturer.
  - C. Frames shall not be modified for the purpose of extending the wheel base.
-

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- D. Any secondary manufacturer that modifies the original chassis frame shall provide a warranty at least equal to the warranty offered by the OEM, and shall certify that the modification and other parts or equipment affected by the modification shall be free from defects in material and workmanship under normal use and service intended by the OEM.
  - E. The frame shall not have cracked or broken frame members.
  - F. The body or frame must not be in contact with a tire or any part of the wheel assemblies.
  - G. Any alteration/repair must meet the OEM/manufacture specification.

---

### 3.I.1. Frame Inspection Procedure

- A. Visually inspect frame for cracks; loosely attached hardware; and sagging, broken, or unapproved welds to frame, side rail or flange.
- B. Visually and physically inspect body hold-down components for damage that would permit the shifting of the body.
- C. Inspect for cracked, loose, bent, broken or unapproved welds to frame member that affect the support of functional components (e.g., steering gear, engine, transmission, body parts or suspension). Welding to frame should be performed only by the manufacturer or a designee.

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### 3.J. Fuel System

- A. The chassis manufacturer must provide fuel tank(s) with a minimum 25-gallon capacity. Each tank shall be filled from and vented to the outside of the passenger compartment, and each fuel filler should be placed in a location where accidental fuel spillage will not drip or drain on any part of the exhaust system.
  - B. The fuel system shall comply with [FMVSS 301, Fuel System Integrity](#).
    - *For buses manufactured on or prior to Dec. 31, 2007, fuel lines must be mounted to obtain maximum possible protection from the chassis frame.*
  - C. Fuel tank(s) may be mounted between the chassis frame rails or outboard of the frame rails on either the left or right side of the vehicle.
  - D. The actual draw capacity of each fuel tank shall be a minimum of 83 percent of the tank capacity.
  - E. Installation of alternative fuel systems, including fuel tanks and piping from the tank to the engine, shall comply with all applicable fire codes in effect on the date of manufacture of the bus.
  - F. A school bus powered by liquefied petroleum or natural gas must display markings as required by [MSS 169.762](#).
  - G. Installation of liquefied petroleum gas (LPG) containers shall comply with National Fire Protection Association (NFPA) 58, Liquefied Petroleum Gas Code as adopted by reference in the Minnesota State Fire Code.
  - H. Installation of Compressed Natural Gas (CNG) containers shall comply with [FMVSS 304, Compressed Natural Gas Fuel Container Integrity](#).
  - I. The CNG Fuel System shall comply with [FMVSS 303, Fuel System Integrity of Compressed Natural Gas Vehicles](#).
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## 3.J.1. Fuel System Inspection Procedure

- A. Visually inspect all parts of the fuel tank, fuel tank cage and fuel system to include lines, hoses, filters, fill cap and fittings for indications of damage or leaks.
- B. Visually and physically inspect fuel lines and hoses for proper securement, routing, and missing or loose clamps that may cause chafing or come in contract with electrical components.
- C. The container must be visually inspected after a motor vehicle accident or fire, or every 36 months or 36,000 miles, whichever comes first – ANSI NGV2.

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## 3.K. Horn

- ❖ MSS [169.4502](#) and [169.68](#)

A bus shall be equipped with a horn in good working order and capable of emitting a sound audible under normal conditions from a distance of not less than 200 feet.

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## 3.L. Steering

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### 3.L.1. Kingpin

- A. Visually inspect the kingpin for looseness, damage, or missing or loose fasteners.
- B. Physically inspect the kingpin for play as follows: With the tire raised off the ground, grasp it at the top and move the wheel assembly in and out. If movement is present, identify the source by following the below procedure:

Have an assistant fully apply the brakes while rechecking play. If the movement disappears with the brakes applied, the play is in the wheel bearings. If the movement remains, it is most likely in the kingpin area. An assembly that has excessive kingpin play of more than 1/2 inch is defective.

---

### 3.L.2. Steering Gear

- ❖ [MSS 169.4501](#)
  - ❖ 49 CFR [393.209 \(d\)](#) and [570.60](#)
- A. The steering gear shall be approved by the chassis manufacturer and designed to ensure safe and accurate performance when the vehicle is operated with maximum load and at maximum speed.
  - B. If external adjustments are required, the steering mechanism shall be accessible to make adjustments.
  - C. Changes not approved by the chassis manufacturer shall not be made to the steering apparatus.
  - D. There shall be a clearance of at least 2 inches between the steering wheel and the cowl, instrument panel, windshield or any other surface.
  - E. Power steering is required and shall be of the integral type with integral valves.
  - F. The steering system shall be designed to provide a means for lubrication of all wear points that are not permanently lubricated.
-

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## 3.L.3. Steering Inspection Procedure

The inspection conditions described in the procedures are considered defects.

### Ball and Socket Joints

- A. With the bus on the ground, the inspector shall examine the ball joint nut stud for movement while the steering wheel is being rocked in a back-and-forth action. The inspector shall examine the ball/socket joint for weld repairs.
- B. Check for lateral and vertical movement by grasping the tie rod and drag link sockets and attempting to laterally and vertically move the ball joint. (Rotational movement will not be considered.) Any motion other than rotational, greater than  $\frac{1}{8}$  inch that can be detected by movement with two hands with moderate strength in any connecting joint is a defect.

### Hoses/Fluids

Visually examine the power steering fluid reservoir for proper fluid level. With the system operating, inspect all system components, hoses and fittings for leaks.

### Nuts

Visually examine all tie rods and the pitman arm, drag link, steering arm and tie rod arm for looseness and missing fasteners.

### Pitman Arm

- A. While the steering wheel is being rotated in a back-and-forth motion; visually inspect the pitman arm and output shaft connection for looseness at the output shaft joint.
- B. Also inspect the pitman arm for damage, cracks or welded repairs.

### Power Steering

- A. Manually manipulate the auxiliary power assist cylinder to check for looseness. Start the bus and rotate the steering wheel in a back-and-forth motion to ensure the power steering pump is operable.
- B. With the engine stopped, inspect the system drive belt(s) for any fraying, cracks or fluid saturation. Check the belt tension. On units equipped with an automatic tensioner, ensure that the tensioner moves freely.
- C. Inspect the fluid reservoir while at operating temperature to ensure that the fluid level is not below the add mark. Inspect for signs of fluid leakage.

### Steering

- A. Visually inspect for any modification or other condition that interferes with free movement of any steering component. Turn the steering wheel through a full right and left turn and feel for binding or jamming conditions. Both front wheels must turn to full right or full left without binding or interference.
  - B. Inspect turn stops by observing for shiny spots and/or signs of wear due to contact with other vehicle components on the sides of tires, drag links, the pitman arm, shock absorbers or brake lines.
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## Steering Column/Wheel

- A. Inspect the steering column for any looseness in bolts, clamps, positioning parts or universal joints. Inspect flexible coupling in steering column (if the vehicle is so equipped) for excessive misalignment and tightness of the clamp bolt or nut.
- B. Inspect the steering column and components for damage, cracks or welded repairs. Inspect the steering wheel to ensure that it is properly positioned and secured.
- C. Place steering axle wheels in a straight-ahead position, have an assistant turn the steering wheel until movement is observed at the left road wheel, and measure the steering wheel movement from the starting position to the wheel movement position. Compare this measurement to the applicable listing in Table 5: Steering Wheel Free Play Values, below.

**Table 5. Steering Wheel Free Play Values**

Steering wheel diameter (inches)	Lash (inches)
16 or less	4 ¼
18	4 ¾
19	5
20	5 ¼
21	5 ½
22	5 ¾

## Steering Gear Box

- A. Visually examine the steering gear box for any loose, damaged or missing mounting bolts. Inspect for cracks in the gear box or mounting brackets, or for any obvious welded repairs.
- B. While having an assistant rock the steering wheel back and forth, visually inspect the steering shaft and gear box for any looseness where the steering gear box is mounted to the frame. Visually inspect the steering shaft coupler for cracks, damage or looseness.
- C. With the engine operating, inspect for excessive fluid and/or oil leaks (observable movement of fluid).

## Tie Rods/Drag Links

- A. While having an assistant rock the steering wheel back and forth, visually inspect the tie rod ends, crossbar and drag links for any looseness at the steering linkage pivot points.
- B. Check for lateral and vertical movement by grasping the tie rod and drag link sockets, attempting to laterally and vertically move the ball joint (rotational movement will not be considered). Any motion, other than rotational, greater than ⅛ inch that can be detected by movement with two hands with moderate strength in any connecting joint is a defect.
- C. Check the crossbar for structural damage and the crossbar clamps for secure mounting.

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## 3.M. Suspension System Standard

- A. The capacity of springs or suspension assemblies shall be commensurate with the chassis manufacturer's GVWR.
- B. Rear leaf springs shall be of a progressive rate or multi-stage design. Front leaf springs shall have a stationary eye at one end and shall be protected by a wrapped leaf, in addition to the main leaf.

---

### 3.M.1. Air Suspension

❖ [49 CFR 393.207 \(f\)](#)

- A. Deflated air suspension (one or more deflated air spring/bag); or
- B. Air spring/bag is missing, broken, or detached at either the top or bottom.

---

### 3.M.2. Axle Parts/Members

- A. Any U-bolt or other spring to axle clamp bolt(s) which are cracked, broken, loose or missing [393.207(a)];
- B. Any axle, axle housing, spring hanger(s), or other axle positioning parts which are cracked, broken, loose or missing that results in shifting of an axle from its normal position [393.207(a)];
- C. Any worn (beyond manufacturer specifications) or improperly assembled U-bolt, shock, kingpin, ball joint, strut, air bag or positioning component [570.61 (a)];
- D. Any spring hanger, assembly part or portion of leaf which is broken, separated or missing [393.207(c)]; or
- E. Any broken coil spring [393.207(d)].

---

### 3.M.3. Shock Absorbers

A school bus must be equipped with front and rear double acting shock absorbers compatible with the manufacturer's rated axle capacity.

Shock absorber mountings, shackles and U-bolts must be securely attached. Shock absorbers must not leak.

---

### 3.M.4. Suspension System Inspection Procedure

- A. Visually and physically inspect all front- and rear-axle components. Inspect all U-bolts and other suspension to axle-mounting hardware for cracks, breaks, looseness or improper type.
  - B. Inspect axle, axle housing, spring hanger(s), shackles or other axle components for alignment, cracks, breaks, and loose or missing items that could result in shifting of an axle from its normal position.
  - C. Inspect front axle beam for signs of improper repair (e.g., welding or heating).
  - D. Inspect for any worn (beyond manufacturer specifications) or improperly assembled U-bolt, shock, kingpin, ball joint, strut, air spring or positioning components.
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- E. Inspect all leaf spring hangers, hanger assemblies or portions of leaf for broken, separated, sagging, bent, abnormally worn (beyond manufacturer specifications), shifted or missing components.
  - F. Inspect pins and bushings for wear, off-center spring eye, rubbing shackle or non-symmetric joints. Inspect for any broken, weak or damaged coil spring and mounting assemblies.
  - G. Visually and physically inspect all hydraulic shock absorbers for leaks, looseness, damage or missing components.
  - H. Inspect air suspension (if equipped). Observe that the vehicle is lifting level. With the air system fully charged, inspect for any audible or visual air leakage in the air spring assembly, supply hoses and connections. **Note:** Use caution whenever underneath the vehicle. There may not be sufficient room should a problem occur with the air suspension system.

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### 3.N. Storage Compartment

A container of adequate strength and capacity for storage of tire chains and/or tow chains and such tools must be provided if such items are carried on the bus. The storage container may be located either inside or outside of the passenger compartment. If inside, it must be fastened to the floor and have a cover.

Interior Overhead Compartments must:

- A. Comply with head-protection requirements of [FMVSS 222, School Bus Passenger Seating and Crash Protection](#), where applicable.
- B. Be completely enclosed and equipped with latching door (both door and latch sufficient to withstand a pushing force of 50 pounds applied at the inside center of the door).
- C. Have all corners and edges rounded with a minimum radius of 1 inch or be padded equivalent to door header padding.
- D. Be attached to the bus sufficiently to withstand a force equal to 20 times the maximum rated capacity of the compartment.
- E. Have no protrusions greater than ¼ inch.

---

### 3.O. Tires

- ❖ MSS [169.4501](#) and [169.4502](#)
  - ❖ [49 CFR 570.62](#)
  - A. Buses manufactured before Jan. 1, 1995 may have different sized tires, but shall not be on the same axle. Therefore, all tires on an axle must be of the same size and construction type – bias ply or radial construction – and must conform to the chassis manufacturer’s GVWR.
  - B. Buses manufactured after Dec. 31, 1994 shall only use tires of the same size and load range on all axles.
  - C. Tires and rims must meet the load rating commensurate with the manufacturers GVWR.
  - D. Tires must not have unrepaired fabric breaks or be repaired with a boot or blowout patch. Tires must not have a bump, bulge, knot or separation. Tires must not have exposed or damaged body cords.
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- E. Recapped tires shall not be used on the front axle.
  - F. Tires must not be re-grooved or re-cut below the original groove depth when extra under-tread rubber was not provided for this purpose, or the tire is not marked "re-groovable."
  - G. Dual rear tires must be provided, except for Type A school buses.
  - H. Recapped tires are only permitted on the rear wheels.
  - I. Front tires shall not be less than  $\frac{4}{32}$  inch in any two adjacent major tread grooves. Measure at three equally spaced intervals around the circumference of the tire. Use a tread-depth gauge for accuracy.
  - J. Rear tires shall not be less than  $\frac{2}{32}$  inch in any two major adjacent tread grooves. Measure at three equally spaced intervals around the circumference of the tire. Use a tread-depth gauge for accuracy.

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### 3.O.1. Spare Tire

If the bus carries a spare tire, it must be suitably mounted in an accessible location outside the passenger compartment.

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### 3.O.2. Tire Inflation

No bus shall be driven with a flat tire or a tire that has an audible air leak. A tire is flat when the air pressure is 50 percent or less of the maximum inflation pressure as indicated on the tire sidewall.

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### 3.O.3. Traction Assisting Devices

- A. Sanders are not required equipment, but if used, they must conform to the standard outlined in [MSS 169.4501](#). They must:
    - 1. Be of a hopper cartridge-valve type.
    - 2. Have a metal hopper with all interior surfaces treated to prevent condensation of moisture.
    - 3. Have a capacity of at least 100 pounds.
    - 4. Have a cover on the filler opening of the hopper that screws into place, sealing the unit airtight.
    - 5. Have discharge tubes extending to the front of each rear wheel under the fender.
    - 6. Have no-clogging discharge tubes with slush proof, non-freezing rubber nozzles.
    - 7. Be operated by an electric switch with a telltale light mounted on the instrument panel.
    - 8. Be exclusively driver controlled.
    - 9. Have a gauge to indicate when the hopper(s) require refilling at no less than  $\frac{1}{4}$  full.
  - B. Automatic traction chains may be installed.
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## 3.P. Trailer Hitch Receiver

- ❖ MSS [169.4501](#) and [169.4502, subdivision 8](#)

Installation of a trailer hitch receiver is permissible, provided it does not extend beyond the rear bumper and follows the chassis manufacturer's specifications.

---

## 3.Q. Towing Attachment Points

Front and/or rear towing devices (i.e., tow hooks, tow eyes, or other designated towing attachment points) shall be furnished to assist in the retrieval of buses that are stuck and/or for towing buses when a wrecker with a wheel lift or axle lift is not available or cannot be applied to the towed vehicle.

- Towing devices shall be attached to the chassis frame either by the chassis manufacturer or in accordance with the chassis manufacturer's specifications.
- Each towing device shall have a strength rating of 13,500 pounds each, for a combined rating of 27,000 pounds with the force applied in the rearward direction, parallel to the ground, and parallel to the longitudinal axis of the chassis frame rail. For pulling and lifting purposes, tow hooks must be used simultaneously. For pulling, angularity applied to the tow hooks will decrease their capacity.
- The towing devices shall be mounted such that they do not project forward of the front bumper or rearward of the rear bumper.

**Note:** Type A buses are exempt from the requirement for front tow hooks or eyes due to built-in crush zones.

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## 3.R. Transmission

- Automatic transmissions shall have no fewer than three forward speeds and one reverse speed. Mechanical shift selectors shall provide a detent between each gear position when the gear selector quadrant and shift selector are not steering-column mounted.
- Automatic transmissions shall have a transmission shifter interlock controlled by the application of the service brake to prohibit accidental engagement of the transmission.
- A manual transmission shall provide not less than three forward gears. Second and higher gears must be synchronized, and at least one reverse gear must be included.
- The shift pattern must be in full view of the driver – [MSS 169.4502, subdivision 12](#).

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## 3.S. Wheel Bearings/Hubs

- Visually inspect the wheel bearing assemblies for looseness, damage, missing, or loose fasteners. This shall include locking pins, draw keys, caps and bearings.
- Visually inspect for any missing (hub) cap, plug, or filler plug, and for any evidence of a leaking wheel seal.
- Physically inspect the wheel bearing assemblies for play as follows: With the tire raised off the ground, grasp it at the top and move the wheel assembly in and out. If movement is present, identify the source by following this procedure:

Have an assistant fully apply brakes while rechecking the play. If the movement disappears with brakes applied, then the play is in the wheel bearings. If the movement remains, it is most

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likely in the kingpin area. The wheel bearing assembly shall not have excessive movement that exceeds .010 ( $\frac{1}{100}$ ) inch measuring at the bearing hub.

- D. Visually inspect A-frames and bushings on Type A vehicles. Inspect bushings for wear, cracking, splitting, or severe extrusion from suspension parts.
- E. For vehicles equipped with "wet hubs" or oil bath hubs the inspector should visually check the site glass for lubricant level.

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### 3.T. Wheel Fasteners

- ❖ 49 CFR [393.205](#) and [570.61 through 570.62](#)

A wheel shall not have any nuts, bolts, studs or lugs that are broken, missing, damaged or loose.

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### 3.U. Wheels

Visually examine for conditions itemized below.

- A. A tire rim, wheel disc, or spider shall have no visible cracks, elongated bolt holes, or any indications of repair by welding.
  - B. A lock or slide ring must not be broken, cracked, improperly seated, sprung or have mismatched rings.
  - C. The use of multi-piece rims or tube-type tires is not permitted on school buses manufactured after Oct. 31, 2004.
-

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## 4. Color

### Item/Method of Inspection

#### 4.A. Buses Manufactured before Jan. 1, 1995

All requirements contained in Chapter 4.A are required under [MN Rules 1993, Chapter 3520](#).

##### 4.A.1. Body Color

The body, including the cowl, shall be National School Bus Yellow.

##### 4.A.2. Other Required Colors

###### A. Beltline

###### ❖ [MSS 169.4503](#)

1. The beltline may be yellow with black lettering or black with yellow lettering. The beltline is the area running the length of the bus body immediately below the side windows and above the seat-level rub rail.
2. Beltline lettering may contain yellow or black reflective material.

###### B. Bumpers (front and rear)

1. The chassis and bumpers shall be painted glossy black.
2. Silver, black, or yellow retroreflective material may be used on the front bumper for increased night visibility.

###### C. Fenders

The fenders may be glossy yellow or glossy black.

###### D. Hood

The hood may be yellow, lusterless black or lusterless yellow.

###### E. Rub Rails

The rub rails adjacent to the beltline may be black or yellow. All other rub rails must be black.

###### F. Wheels

The wheels shall be painted glossy black.

##### 4.A.3. Optional Colors

Wheels, rims, chassis grills, mirror backs, rims and mounting brackets, reflective housings, window frame accessories and other trim items may be a color other than yellow or black.

#### 4.B. Buses Manufactured after Dec. 31, 1994

- A. A Multifunction School Activity Bus (MFSAB) shall be exempt from these requirements.
- B. A Head Start bus that is not equipped as a school bus must be painted colors other than national school bus yellow.

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## 4.B.1. Body

The school bus body, including the cowl, shall be painted NSBY.

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## 4.B.2. Other Required Colors

### A. Beltline

❖ [MSS 169.4503](#)

The beltline may be yellow with black lettering or black with yellow lettering. The beltline is the area running the length of the bus body immediately below the side windows and above the seat-level rub rail.

### B. Bumper

The bumpers and chassis shall be black.

### C. Fenders and Fenderettes

❖ [MSS 169.4502](#) and [169.4503](#)

May be black.

### D. Grill

❖ [MSS 169.4502](#)

The grill may be the manufacturer's standard color or chrome.

### E. Hood

❖ [MSS 169.4502](#)

The hood may be NSBY, non-reflective yellow or non-reflective black.

### F. Lettering

Unless otherwise specified, all required lettering shall be black.

### G. Roof

Except for the vertical portion of the front and rear roof caps, the roof of the bus, above the drip rails, may be white.

### H. Rub Rails

❖ [MSS 169.4503](#)

The rub rails adjacent to the beltline may be black or yellow. All other rub rails must be black.

### I. Signal Lamps (Eight-Ways)

❖ [MSS 169.4503](#)

The area around the lenses of alternately flashing signal lamps extending outward from the edge of the lamp 3 inches, plus or minus  $\frac{1}{4}$  inch, to the sides and top and at least 1 inch to the bottom, must be black.

### J. Visor and Hoods

When provided, visors or hoods over the flashing warning signal lamps shall be black.

### K. Wheels

May be silver, gray, white, yellow or black.

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## 5. Lamps and Signals

When checking LED (light emitting diode) lighting, if more than 25 percent of the LED's elements fail to illuminate the light must be replaced.

### References

- ❖ MSS [169.4501](#); [169.4503](#); [169.47](#); [169.48](#); [169.49](#); [169.50, subdivision 1\(a\)](#); [169.51](#); [169.57](#); [169.60](#); [169.64, subdivision 8](#)
- ❖ FMVSS [101](#), [108](#) and [131](#)

### Exterior

Item on vehicle	Qty.	Color	Location	Position	Height
<b>5.A. Headlamps</b>	2	White	Front	On the front at the same height, with an equal number at each side of the vertical centerline as far apart as practicable.	Not less than 22 inches nor more than 54 inches above the road surface.
				A daytime running lamps system shall be provided for buses manufactured on or after Jan. 01, 2008.	
<b>5.B. Turn Signals</b>	2	Amber	At or near the front	One on each side of the vertical centerline at the same height and as far apart as practicable.	Not less than 15 inches nor more than 83 inches above the road surface.
	2	Amber	One on each side (Intermediate)	Left side lamp shall be mounted rearward of the stop signal arm, and the right side lamp shall be mounted rearward of the entrance door.	
	2	Amber	Rear	At least 7 inches in diameter or, if a shape other than round, a minimum of 38 square inches, one on each side of the vertical centerline, and as far apart as practicable.	Their horizontal centerline shall be a maximum of 12 inches below the rear window.
<b>5.C. Vehicular Hazard Warning Signal Flasher Lamps</b>	2	Amber	Front	See turn signal (front).	
	2	Amber	Rear	See turn signal (rear).	
				Note: The turn signal lamps must be connected to the chassis hazard warning switch to cause simultaneous flashing of turn signal lamps when needed as a vehicular traffic hazard warning.	
<b>5.D. Clearance Lamps</b>	2	Amber	One on each side on the front of the vehicle	One on each side of the vertical centerline to indicate overall width.	The front clearance lamps shall both be on the same level, as high as practicable, located at a height of not less than 24 inches above the headlamp centers.

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	2	Red	One on each side on the rear of the vehicle	One on each side of the vertical centerline to indicate overall width.	Both on the same level, as high as practicable.
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<b>5.E. Identification Lamps</b>	3	Amber	Front	As close as practicable to the top of the vehicle, at the same height, and as close as practicable to the vertical centerline of the vehicle with lamp centers spaced not less than 6 inches nor more than 12 inches apart. Alternatively, the lamps may be located as close as practicable to the top of the cab.	All three on the same level as close as practicable to the top of the vehicle.
	3	Red	Rear	One as close as practicable to the vertical centerline. One on each side with lamp centers not less than 6 inches nor more than 12 inches apart.	All three on the same level, as close as practicable to the top of the vehicle.

<b>5.F. Eight Lamp Warning System</b>	4	Two red, two amber	Front	On the front of the cab, as far apart as practicable, but in no case shall the spacing between lamps be less than 40 inches. Amber lamps must be mounted at the same height as, and just inboard of the red lamps.	As high as practicable but at least above the windshield.
	4	Two red, two amber	Rear	On the rear of the bus body as far apart as practicable, but in no case shall the spacing between lamps be less than 40 inches. Amber lamps must be mounted at the same height as and just inboard of the red lamps.	As high as practicable but at least above the top of any side window opening

Note: Flashing alternately between 60 to 120 cycles per minute, with an activation period sufficient to allow the lamp to reach full brightness. Amber lamps may only be activated by manual or foot operation, and must be automatically deactivated and the red lamps must be automatically activated when the bus entrance door is opened (FMVSS 108) or stop-arm is extended. (See also [8.B](#))

<b>5.G. Stop-Arm Lamp System</b>		Red lamps		Each side of the stop signal arm must have at least two red lamps installed on a non-reflective stop sign.	The lamps must be centered on the vertical centerline of the stop-arm. One lamps must be at the extreme top and other at the extreme bottom.
		Red lamps		Option1: Each side of the stop signal arm may be illuminated with at least two red lamps installed on a reflective stop sign.  Option 2: Letters that form the word "STOP" may be illuminated by outlining each letter, or illuminating the middle of each letter stroke.	The lamps must be centered on the vertical centerline of the stop-arm.

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Note: Any letters that fail to illuminate as outlined in Option 2 will be considered a fail. (See 8.C)

<b>5.H. Side Marker Lamp(s)</b>	2	Amber	One on each side (front)	As far to the front as practicable.	Not less than 15 inches above the road surface.
	2	Amber	One on each side (Intermediate)	At or near the midpoint between the front and rear side marker lamps, if the length of the vehicle is more than 30 feet.	Not less than 15 inches above the road surface.
	2	Red	One on each side (rear)	As far to the rear as practicable.	Not less than 15 inches above the road surface.
<b>5.I. Reflex Reflector(s)</b>	2	Amber	One on each side	At or near the midpoint between front- and rear-side marker lamps, if the length of the vehicle is more than 30 feet.	Between 15 inches and 60 inches above the road surface.
	2	Red	Rear	One on each side of the vertical centerline, as far apart as practicable, and at the same height.	Both on the same level, between 15 inches and 60 inches above the road surface.
	2	Red	One on each side (rear)	As far to the rear as practicable.	Both on the same level, between 15 inches and 60 inches above the road surface.
	2	Amber	One on each side (front)	As far to the front as practicable.	Both on the same level, between 15 inches and 60 inches above the road surface.
<b>5.J. Strobe Lamp</b>	1	White	Roof	White strobe lamp of double flash type centered on the roof not closer than 12 inches or more than 6 feet from the rear roof edge. Cannot be located forward of a roof hatch.	
<b>5.K. Tail/Stop Lamps</b>	2	Red	Rear	Two combination lamps with a minimum diameter of 7 inches, or if a shape other than round, a minimum 38 square inches of illuminated area shall be mounted on the rear of the bus just inboard of the turn signal lamps.	On the same level as the turn signal lamps with centers a maximum of 12 inches below the rear window.
	2	Red	Rear (auxiliary stop lamps)	Two combination lamps with a minimum diameter of 4 inches, or if a shape other than round, a minimum of 12 square inches of illuminated area, one each side of the vertical centerline and evenly spaced.  Note: A rear auxiliary stop lamp may incorporate the required license plate lamp.	Placed on the rear of the body on the same level between the beltline and the floor line.

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<b>5.L. Backup Lamp</b>	2	White	Rear	At least 4 inches in diameter or, if a shape other than round, a minimum of 12 square inches of illuminated area. If placed on the same horizontal line as the brake lamps and turn signal lamps, they shall be to the inside.	No requirement.
<b>5.M. License Plate Lamp</b>	1	White	Rear	At the rear license plate to illuminate the plate from the top or sides.  Note: May be combined with auxiliary tail lamp.	No requirement.
<b>5.N. Parking Lamps</b>	2	Amber or White	Front and rear	Additional Lamps Required on All Passenger Cars, and on Multipurpose Passenger Vehicles (MPV), Trucks, and Buses, Less Than 80 inches (2032 MM) in Overall Width  On the front, at the same height, symmetrically about the vertical centerline, as far apart as practicable  Note: Parking lamps must be steady burning and activate when the headlamps are on.	Not less than 15 inches, nor more than 72 inches
<b>5.O. Stop Lamp (High Mount)</b>		One red, or two red		On the rear including glazing, with the lamp center on the vertical centerline as viewed from the rear  Note : Must only be activated upon application of the service brakes or may be activated by a device designed to retard the motion of the vehicle. The lamp must be steady burning.  Exceptions may apply. See FMVSS 131, Section 6.1.1.2.	Not less than 34 inches except for passenger cars. See FMVSS 131, Section 6.1.4.1

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## Interior

Item on vehicle	Qty	Color	Location	Position	Height
<b>5.P. Headlamp Dimmer Switch</b>				The dimmer switch must allow the driver to switch between low and high beam intensities.	
<b>5.Q. High Beam Headlamp Indicator</b>	1			In view of the driver to indicate high beam headlamps are illuminated.	
<b>5.R. Turn Signal/Hazard Flasher Indicator</b>	1 or 2			In view of the driver to indicate a turn signal or hazard flashers have been activated.	
<b>5.S. Brake System Indicator Lamp(s)</b>				In view of driver to indicate either failure of a brake system (air/hydraulic, hydraulic/hydraulic, ABS) or activation of parking brake.	
<b>5.T. Other Required Indicator Lamps</b>				Other required indicator lamps include glow plug (when applicable), special service door.	
<b>5.U. Eight-Lamp System Indicator</b>				In view of driver to indicate actuation of the eight-lamp warning signals.	
<b>5.V. Interior Lamps</b>		White	Front to Rear	Positioned to illuminate the aisle. Interior lamps that illuminate the aisle shall be provided.	Optional
<b>5.W. Stepwell Lamp</b>	1	White	Stepwell	Positioned to illuminate the stepwell.  The lamp shall be illuminated by an entrance door-operated switch, to illuminate only when headlamps and clearance lamps are on and the entrance door is open.	Optional, but must directly illuminate the steps immediately inside the entrance door.

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## 6. Lettering and Markings

### Item/Method of Inspection

This chapter applies to Types A, B, C and D school buses. Only signs and lettering approved or required by state law are permitted to be displayed.

#### 6.A. Notice of Recording Devices

- ❖ MSS 121A.585

If a video or audio recording device is placed on a school bus, the bus also must display a sign or signs, conspicuously placed, notifying riders that their conversations or actions may be recorded.

#### 6.B. Prohibited Lettering

Lettering on a school bus shall be limited as specified in this section and state law.

#### 6.C. School Bus Signs

- A. The bus body shall bear the words "SCHOOL BUS" in black letters at least 8 inches high on both the front and rear of the body or on signs attached thereto. Lettering shall be placed as high as possible without impairment of its visibility. Letters shall conform to "Series B" of Standard Alphabets for Highway Signs.
- B. "SCHOOL BUS" lettering shall have a reflective background, or as an option, may be illuminated by backlighting.
- C. MFSABs are exempt from these requirements.

#### 6.D. School Bus Identification; other requirements

- ❖ [MSS 169.4503 subdivision 13](#)

- A. Identification numbers must appear on the sides and rear of the bus.
- B. Symbols or letters may be used on the outside of the bus near the entrance door so that students can identify them.
- C. Each bus shall display the school district serviced, company name, or the owner of the bus within the beltline area.
- D. The rear of each bus shall display "Unlawful to pass when red lights are flashing" in 2-inch black letters on a NSBY background. This message shall be displayed directly below the upper window of the rear door. On rear-engine buses, it shall be centered at approximately the same location. This applies to school buses manufactured after Dec. 31, 1994.
- E. In lieu of paragraph D, a Type A, B, C or D bus may be equipped with a changeable electronic message sign on the rear of the bus that:
  1. Displays one or more of these messages: "Caution/Stopping," "Unlawful to pass," "Stop /Do not pass," or similar messages approved by the commissioner.
  2. Displays messages in conjunction with bus operation and activation of pre-warning flashing amber signals, flashing red signals, or stop-signal arm, as appropriate.
  3. Is a supplemental warning system (10.8.D.2, Supplemental Warning System) under [MSS 169.4503, subdivision 31](#).

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## 6.E. School Bus Identification (optional)

Other lettering, numbering or symbols that may be displayed on the exterior of the bus shall be limited to:

- A. Bus identification number, minimum 12-inch high characters, on top of the bus, in addition to required numbering on the sides, rear and front.
- B. The location of the battery(ies) identified by the word "BATTERY" or "BATTERIES" on the battery compartment door in 2-inch lettering.
- C. Manufacturer, dealer or school identification or logos.
- D. Symbols identifying the bus as equipped for or transporting students with special needs as noted in [Chapter 9, Specially Equipped School Buses](#).
- E. Identification of fuel type in 1-inch lettering adjacent to the fuel filler opening.

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## 6.F. Tax Exempt Buses

❖ [MSS 168.012, subdivision 1\(k\)](#)

All vehicles displaying tax-exempt license plates must have the name of the operating organization/entity plainly displayed on both sides of the vehicle. This identification must be in a color that contrasts with the part of the vehicle on which it is placed and must endure throughout the term of the registration. Types A, B, C, and D school buses must adhere to the school bus color requirements outlined in [Chapter 4, Color](#). The identification must not be on a removable plate or placard and must be kept clean and visible at all times. Exception: A removable plate or placard may be utilized on vehicles leased or loaned to a political subdivision.

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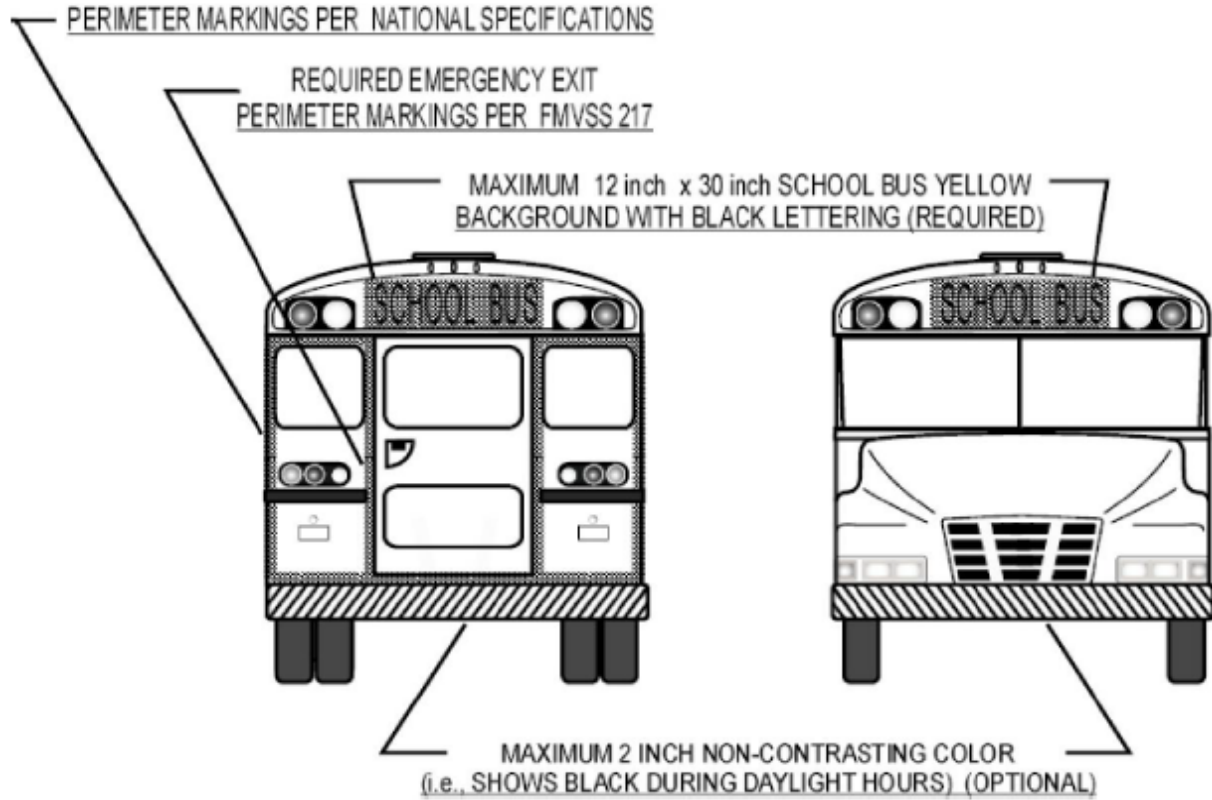
## 6.G. Reflective Material

- A. The front and/or rear bumper may be marked with non-contrasting retroreflective material. It must be applied diagonally 45 degrees down toward the centerline of the pavement with 2-inch wide strips (plus or minus ¼ inch).
  - B. The rear of the bus body shall be marked with strips of retroreflective NSBY material to outline the perimeter of the back of the bus using material that conforms to the requirements of [FMVSS 131, School Bus Pedestrian Safety Devices, Table 1](#). The perimeter marking of rear emergency exits per [FMVSS 217, Bus Emergency Exits and Window Retention and Release](#), and/or the use of retroreflective "SCHOOL BUS" signs, partially accomplishes the objective of this requirement. To complete the perimeter marking of the back of the bus, strips of retroreflective NSBY material, a minimum of 1 inch and a maximum of 2 inches in width, shall be applied horizontally above the rear windows and above the rear bumper, extending from the rear emergency exit perimeter, marking outward to the left and right rear corners of the bus. Vertical strips shall be applied at the corners connecting these horizontal strips. MFSABs shall be exempt from these color requirements.
  - C. "SCHOOL BUS" signs, if not a lighted design, shall be marked with retroreflective NSBY material as the background for lettering of the front and/or rear "SCHOOL BUS" signs.
  - D. The sides of the bus shall have reflective material with a minimum width of 1 ¾ inch. The effective date is Jan. 1, 1996.
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## PLACEMENT OF RETROREFLECTIVE MARKINGS





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## 7. Safety Equipment

### Item/Method of Inspection

#### 7.A. Body Fluid Cleanup Kit

School buses must have a removable, moisture-proof body fluid cleanup kit that is properly mounted and identified.

The package of materials must include, but is not limited to, latex gloves, disposal bag and absorbent material, used to clean up spills of potentially infected bodily fluids, under OSHA's Bloodborne Pathogens regulations and Universal Precautions practices; also known as a hygiene kit.

#### 7.B. Emergency Equipment

##### 7.B.1. First Aid Supplies

The bus shall have a removable, moisture- and dust-proof first aid kit in an accessible place in the driver's compartment. The location for the first aid kit shall be marked.

The first aid kit must have the following units and packages per unit as outlined in Charts 1 and 2. First aid supplies must be replaced if they are used.

**Chart 1**

Required supplies for buses manufactured before Jan. 1, 1995.

Unit Size	10 Unit	24 Unit	36 Unit
4-inch compress bandage	2	6	8
2-inch compress bandage	1	3	7
1-inch adhesive compress	2	2	4
40-inch triangular bandage	-	2	4
4-inch gauze bandage	0	2	4
Absorbent gauze compress	1	2	2
24 x 72-inch gauze compress	1	2	2
Padded tongue blades (Only to be used as a splint)	1	1	1
1-inch x 2 ½-yard adhesive tape*	1	1	2
Wire splint	-	2	2

\*Buses manufactured before 1995 shall have 2-2 adhesive tape (1 inch x 2 ½ yards) for 10 and 24 Unit kits.

**Note: Chart 2 may be used in lieu of Chart 1.**

Capacity 1-16: 10 Unit.  
 Capacity 17-42: 24 Unit.  
 Capacity >42: 36 Unit.

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**Chart 2**

Required supplies for Types A, B, C and D buses manufactured after Dec. 31, 1994.

Unit Size	Number Count
1-inch x 2 ½-yard adhesive tape rolls	2
3-inch x 3-inch sterile gauze pads	24
3-inch x ¾-inch adhesive bandage	100
2-inch bandage compress	8
3-inch bandage compress	10
2-inch x 6-inch sterile gauze roller bandages	2
40-inch x 36-inch x 54-inch (approx.) non-sterile triangular bandage	2
36-inch x 36-inch sterile gauze pads	3
Eye pads, sterile	3
Scissors, rounded-end	1
Latex gloves (pair)	1
Mouth-to-mouth airway	1

## 7.B.2. Fire extinguisher

- A. The bus shall be equipped with at least one UL-approved, pressurized, dry chemical fire extinguisher. The extinguisher shall be secured in a mounted bracket located in the driver's compartment and readily accessible to the driver and passengers. A pressure gauge shall be mounted on the extinguisher and shall be easily read without moving the extinguisher from its mounted position.
- B. The fire extinguisher shall have a rating of 2-A:10-BC, or greater. The operating mechanism shall be secured with a type of seal that will not interfere with the use of the fire extinguisher.

## 7.C. Seat Belt Cutter

NOTE: This subpart does not apply to Type III vehicles.

- A. Buses manufactured before Jan. 1, 2008 and equipped with passenger restraints shall be equipped with a seat belt cutter. The seat belt cutter must be designed to prevent injury during use, and it must be stored in a safe but accessible location.
- B. Buses manufactured Jan. 1, 2008 through Dec. 31, 2012 shall be equipped with a seat belt cutter with a full-width handgrip and a protected, replaceable or non-corrodible blade. It shall be mounted in a location accessible to a seated driver in an easily detachable manner.
- C. Buses manufactured after Dec. 31, 2012 and equipped with wheelchair- or passenger-restraint devices shall be equipped with an additional seat belt cutter. There is no specific location requirement for the second cutter.

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**7.D. Triangle Road Warning Devices**

Each school bus shall contain at least three retroreflective triangle road warning devices that meet the requirements of [FMVSS 125, Warning Devices](#). They shall be mounted in an accessible place.

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**7.E. Two-Way Communication**

❖ [MSS 169.4503, subdivision 6](#)

All buses manufactured after January 1, 1995, shall have a two-way voice communications system.

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## 8. Student Pedestrian Safety

### Item/Method of Inspection

When checking light emitting diode (LED) lighting, if more than 25 percent of the LEDs fail to illuminate, the light must be replaced.

#### 8.A. Crossing Control Arm

- ❖ MSS [169.4501](#) and [169.4503 subdivision 28](#)

All buses manufactured for use in Minnesota after Jan. 1, 2013, shall be equipped with a crossing control arm mounted at the right front corner of the front bumper. The crossing control arm shall be automatically activated whenever the bus is stopped with the flashing red signals in use. A crossing control may be installed on a school bus manufactured before Jan. 1, 2013. If installed, it must function properly.

- A. When opened, this arm shall extend in a line parallel to the body side and aligned with the right front wheel.
- B. All components of the crossing control arm and all connections shall be weatherproofed.
- C. The crossing control arm shall incorporate system connectors (electrical, vacuum or air) at the gate and shall be easily removable to allow for towing of the bus.
- D. The crossing control arm shall be constructed of non-corrodible or nonferrous material or shall be treated in accordance with the body sheet metal specification. (See [Chapter 1, Metal Treatment](#).)
- E. There shall be no sharp edges or projections that could cause injury or be a hazard to students. The end of the arm shall be rounded.
- F. The crossing control arm shall extend a minimum of 70 inches (measured from the bumper at the arm assembly attachment point) when in the extended position. The crossing control arm shall not extend past the end of the bumper when in the stowed position.
- G. The crossing control arm shall extend simultaneously with the stop signal arm(s), activated by stop signal arm controls.
- H. An automatic recycling interrupt switch may be installed for temporarily disabling the crossing control arm.
- I. The assembly shall include a device attached to the bumper near the end of the arm to automatically retain the arm while in the stowed position. That device shall not interfere with normal operations of the crossing control arm.

#### 8.B. School Bus Signal Lamps (Eight Lamp Warning System)

- ❖ MSS [169.442](#), [169.4501](#), [169.4503](#)
- ❖ [FMVSS 108](#)

- A. Installation of an alternately flashing eight-lamp warning system must comply with the following regulation for all lamps on the exterior of the vehicle.

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- a. Each alternately flashing signal lamp must be mounted with its axis substantially parallel.
  - b. Alternately flashing signal lamps must be mounted on the same horizontal centerline and above the windshield and at the rear on the same horizontal centerline so that the lower edge of the lens is not lower than the top line of the side window. The vertical and lateral vision of the front and rear alternately flashing signal lamps must not be obstructed by any part of the body or lamp-house insofar as standard bus body construction permits.
  - c. The system must be wired so the amber signal lamps are activated only by hand operation, and if activated, are automatically deactivated and the red signal lamps are automatically activated when the bus entrance door is opened.
  - d. An amber pilot lamp and a red pilot lamp shall be installed adjacent to the driver controls for the flashing signal lamp to indicate to the driver which lamp system is activated.

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## 8.C. Stop-Arm System

- ❖ MSS [169.442](#) and [169.4501](#)
  - ❖ [FMVSS 131](#)
- A. The stop-arm must be installed on the left outside of the body near the front. It shall meet the requirements of [FMVSS 131, School Bus Pedestrian Safety Devices](#). The stop-arm shall be on an octagonal shape with white letters and border, and a red background.
  - B. It must extend and retract automatically in conjunction with the flashing red warning lamps and must be activated and deactivated by the entrance door switch.
  - C. It shall be either reflective or equipped with flashing lamps (incandescent, LED, or strobe). The stop-arm lamps shall be connected to the alternately flashing red warning lamps. The stop-arm shall be vacuum, electric or air operated. If reflectorized material is used, it shall have no damaged area on either side of the arm.
  - D. A reflective stop-arm may be equipped with optional alternately flashing red lamps.
  - E. School buses may be equipped with a stop-arm mounted on the left rear corner of the school bus if it complies with [FMVSS 131](#). When two stop signs are installed on the school bus, the rear-most sign shall not be reflectorized, or contain any lettering, symbols, or markings on the forward side.
  - F. Every school bus stop-arm shall be shaped, operate and be kept in working order as outlined in this section. It must extend and retract automatically in conjunction with the alternately flashing red signal lights and must be activated and deactivated by the entrance door switch.
  - G. Stop-arm LEDs that form the word "STOP" shall form the complete shape of the letters. Any inoperable LEDs will place the school bus out of service.

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### 8.C.1. Stop-Arm Lamp Requirement

- A. Non-reflective sign  
Any required lamp on a non-reflective sign that is inoperative, including lights that form the word "STOP".
-

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B. Reflective sign

Each side of the stop signal arm may be illuminated with at least two red lamps installed on a reflective stop sign. The lamps must be centered on the vertical centerline of the stop-arm. Any optional lamp that is inoperative is considered a defect.

Note: inoperable lights on a reflective sign do not constitute an out of service defect.

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**8.D. Optional Warning Systems**

School buses may be equipped with the following safety equipment devices.

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**8.D.1. Exterior Student-Control System**

- ❖ [MSS 169.442, subdivision 4](#)

In addition to equipment required under subdivision 1, and notwithstanding section 169.64, a school bus may be equipped with a driver-activated, exterior student-control warning system. The driver shall activate this system when the use of the stop-signal arm and flashing red signals is required under section [169.443, subdivision 1](#).

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**8.D.2. Supplemental Warning System**

- ❖ [MSS 169.442, subdivision 6](#)

In addition to the signals required under [MSS 169.442, subdivision 1](#), a Type A, B, C or D school bus may be equipped with a supplemental warning system under section [MSS 169.4503, subdivision 31](#).

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**8.D.3. Strobe Light**

- ❖ MSS [169.442](#); [169.4501](#); and [169.64, subdivision 8](#)

The strobe lamp may be wired to activate with the amber alternately flashing signal lamps, continuing through the full loading or unloading cycle, and may be equipped with an override switch to allow activation of the strobe (5.J) at any time for use in inclement weather.

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## 9. Specially Equipped School Buses

### Item/Method of Inspection

Wheelchair use will not be permitted in a properly equipped school bus if there is a failure to meet any of the design standards outlined within this chapter. Enter "Not Certified (NC)" for those violations that do not have a point value associated with them.

#### 9.A. Aisles

- ❖ MSS [169.4501](#) and [169.4504](#)

All school buses equipped with a power lift shall provide at least a 12-inch aisle leading from the wheelchair position to at least one emergency door and special service entrance.

A wheelchair securement position shall never be located directly in front of (blocking) a power lift door location.

#### 9.B. Annual Certificate

- ❖ State Patrol use only

If all securement devices meet the design and installation requirements, enter the number of certified wheelchair positions on the school bus sticker affixed to the windshield.

- A. The maximum number of positions is based on the inspection certification.
- B. If additional wheelchair positions are desired beyond what has already been inspected, a new inspection is required.
- C. Type III vehicles are limited to 10 seating positions including the driver. A wheelchair position counts as four seating positions towards the total aggregate count.

#### 9.C. Identification (International Symbol)

Specially equipped school buses shall display the International Symbol of Accessibility below the window line. Such emblems shall be white on blue or black background, shall not exceed 12 inches square in size, and shall be of a high-intensity retroreflective material meeting the requirements of [FHWA FP-85, Section 718, Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects](#).

#### 9.D. Occupant Restraint

- ❖ MSS [169.4501](#) and [299A.13](#)

Inspect vehicles with securement devices for occupant restraints according to the following criteria.

##### A. General Seat Belt Requirements

Check that a Type II (lap and shoulder) seat belt assembly meets the manufacturer's requirement under FMVSS [209](#) and [210](#).

Reject if:

- Belts or material clearly indicates it is not manufactured for such use.
- Belts are installed in accordance with [FMVSS 210](#) and the NSTSP requirements.

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- Seat belt assembly is not permanently marked/labeled with the year of manufacture, model, and the name of the manufacturer or distributor.
  - Lap or shoulder belt is damaged or missing hardware.
- B. Special Restraining Devices  
Special restraining devices such as shoulder harness, lap belts and chest restraint systems shall be installed to the seats if the devices do not require the alteration, in any form, of the seat, seat cushion, framework or related seat components. The restraints must be for the sole purpose of restraining students with disabilities (see [MSS 169.4504](#)).
- C. Child Restraint/Child Safety Seating  
This includes child restraint and child safety seat use. Additionally, always verify child seat expirations (if applicable).
1. On power lift-equipped school buses with a GVWR of 10,000 pounds or more, seat frames may be equipped with attachment points to which belt assemblies can be attached for use with child safety restraint systems (CSRs) that comply with [FMVSS 213, Child Restraint Systems](#). Any belt assembly anchorage shall comply with [FMVSS 210, Seat Belt Assembly Anchorages](#).
  2. Alternatively, a child restraint anchorage system that complies with [FMVSS 225, Child Restraint Anchorage Systems](#), may be installed.
  3. Seat belt assemblies, if installed, shall conform to [FMVSS 209, Seat Belt Assemblies](#).
  4. Child safety restraint systems, which facilitate the transportation of children who in other modes of transportation would be required to use a child, infant or booster seat, shall conform to [FMVSS 213](#). This includes child restraint and child safety seat use.

## 9.E. Power Lift Requirements

- A. All school buses designed with a power lift shall have the lift located on the right side of the bus body, unless a ramp is needed for unusual circumstances related to passenger needs.  
**Note:** The lift may be located on the left side of the bus if is used to deliver students exclusively on the left side of a one-way street.
- B. The lift shall be capable of lifting a minimum weight of 800 pounds. School buses manufactured before Jan. 1, 1995 must be equipped with at least a 750-pound lift capacity and be capable of lifting the wheelchair, occupant and school bus attendant.
- C. A resettable circuit breaker shall be installed between the power source and the lift motor if electrical power is used. It shall be located as close to the power source as possible, but not within the passenger/driver compartment (see [MSS 169.4501](#)).

### 9.E.1. 403 Standard

- ❖ [FMVSS 403](#)
- A. This standard applies to platform lifts manufactured on and after April 1, 2005, that are designed to carry standing passengers, who may be aided by canes or walkers, as well as persons seated in wheelchairs, scooters and other mobility aids, into and out of motor vehicles.



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The following components must be installed and working to be in compliance with the 403 standard:

- Threshold warning system.
- Hand pendant needs to be backlit.
- On/off switch.
- 25-lb. bridge plate sensor adjustment.
- Handrails need to be reinforced and capable of withstanding 250 lbs. in any direction.
- Outboard roll-stop must be up and locked before the platform is 3 inches above the ground.
- 50 lb. weight stow pressure.
- Cycle counter.
- Manual backup system.
- A label with the words "DOT Public Use Lift."
- Interlocks – The platform lift system must have interlocks or operate in such a manner when installed according to the installation instructions to prevent vehicle movement unless the platform is stowed. It must also prevent the operation of the platform lift from the stowed position until vehicle movement is inhibited.

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## 9.E.2. 404 Standard

❖ [FMVSS 404](#)

This standard applies to motor vehicles manufactured on and after July 1, 2005, that are equipped with a platform lift designed to carry standing passengers who may be aided by canes or walkers, as well as persons seated in wheelchairs, scooters and other mobility aids, into and out of the vehicle.

- Platform lighting.
- The lift must be installed exactly per the manufacturer's instructions.

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## 9.E.3. Lifts/Vehicles Exempt from 403/404 Standard

- \* This section only applies to school buses manufactured before July 1, 2005.
  - A. The lift platform shall have a minimum of a 30-inch clear usable width, unobstructed by required hand rail(s). The minimum clear length of the platform between the outer edge barrier and inner edge shall be 40 inches (48 inches for school buses manufactured after Jan. 1, 1998).
  - B. Controls shall be provided to allow the operator to operate lift from inside or outside the school bus. The lift shall be designed to prevent falling due to a power failure or single component mechanical failure. The lift shall be designed with a manual backup in the event of a power failure. All lift controls must be portable and conveniently located on the inside of the school bus lift door.
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- C. The platform edge and sides shall be designed to restrain wheelchairs or other mobile devices from slipping or rolling off. Additionally, the platform must be covered with a skid-resistant material or be designed to prevent slipping. It must be constructed to permit vision through that portion of the platform covering the window of the special service door when in the stowed position. The outer-edge barrier shall be automatically or manually lowered when the platform is at ground level.
  - D. The power lift must be designed so the lift will not operate unless the special service door(s) is opened.
  - E. At least one handrail shall be installed. The handrail shall be approximately 25 to 34 inches in height, a minimum of 18 inches in length and designed to fold when in the stowed position.
    - \* Buses manufactured after Jan. 1, 1998 require two hand rails with a height of 30-38 inches above the platform.
  - F. Lift design shall prevent excessive pressure that could damage the lift system when the platform is fully raised or lowered, or prevent vehicle jacking. Lift travel shall allow the platform to rest securely on the ground.

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## 9.E.4. Ramp

- ❖ [MSS 169.4501](#) (2010 NSTSP) and [299A.13](#)
- ❖ [49 CFR 38.23](#)
- A. If a ramp is used, it shall be of sufficient strength and rigidity to support at least 600 lbs. over an area of 26 by 26 inches. It shall be equipped with a protective flange on each longitudinal side to keep the special device on the ramp.
- B. The surface of the ramp shall be constructed of nonskid material.
- C. The ramp shall be equipped with handles and shall be of weight and design to permit one person to put the ramp in place and return it to its storage place. It shall be stored outside the passenger compartment.

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## 9.F. Special Entrance

- A. The special service entrance and door shall be located on the right side of the bus and shall be designed not to obstruct the regular service entrance.
 

**Note:** A special service entrance and door may be located on the left side of the bus if the bus is used only to deliver students to the left side of one-way streets and its use is limited to that function.
- B. The doorpost, headers and all floor sections around this special opening must be reinforced to provide strength and support equivalent to adjacent side wall and floor construction of an unaltered model.
- C. A drip mold must be installed above the opening to effectively channel the water away from the entrance.

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## 9.G. Special Service Entrance Door(s)

- A. A single door or double doors may be used for the special service entrance.
  - B. A single door shall be hinged to the forward side of the entrance unless this would obstruct the regular service entrance. If the door is hinged to the rearward side of the doorway, the
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door shall utilize a safety mechanism that will prevent the door from swinging open should the primary door latch fail. If double doors are used, the system shall be designed to prevent the door(s) from being blown open by the aerodynamic forces created by the forward motion of the bus, and/or shall incorporate a safety mechanism to provide secondary protection should the primary latching mechanism(s) fail.

- C. Door materials, panels and structural components shall have strength equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering and other exterior features shall match adjacent sections of the body.
- D. All doors shall be weather sealed.
- E. When manually operated dual doors are provided, the rear door shall have at least a one-point fastening device to the header. The forward-mounted door shall have at least three one-point fastening devices. One shall be to the header, one to the floor line of the body, and the other shall be into the rear door. The door and hinge mechanism shall have strength that is greater than, or equivalent to, the strength of the emergency exit door.
- F. All doors shall have positive fastening devices to hold doors in the "open" position when the special service entrance is in use.
- G. Each door shall have windows set in a waterproof manner that are visually similar in size and location to adjacent non-door windows. Glazing shall be of the same type and tinting (if applicable) as standard fixed glass in other body locations.
- H. Special service entrance doors shall be equipped with padding at the top edge of the door opening. The padding shall be at least three inches wide and one inch thick and shall extend the full width of the door opening.
- I. Doorways in which lifts are installed shall be equipped with a special light that provides a minimum of two foot-candles of illumination measured on the floor of the bus immediately adjacent to the lift during lift operation.
- J. Door(s) shall be equipped with a device that will activate an audible or visible signal located in the driver's compartment when the door(s) is not securely closed and the ignition is in the "on" position.

The flashing device may be hooked into the emergency brake in such a manner as not to flash if the emergency brake is securely in the brake position on school buses manufactured before Jan. 1, 1995.

- K. A switch shall be installed so that the lift mechanism will not operate when the lift platform door(s) is closed.

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## 9.H. Support Equipment and Accessories

- A. In addition to the webbing cutter required in 7.C, Seat Belt Cutter, each specially equipped school bus that is set up to accommodate wheelchairs or other assistive or restraint devices with webbing attached shall contain an additional webbing cutter that is properly secured in a location to be determined by the purchaser. The webbing cutter shall have a full-width handgrip and a protected, replaceable or non-corrodible blade.
  - B. Each specially equipped school bus that is set up to accommodate wheelchairs or other assistive restraint devices should be equipped with an emergency evacuation device that is
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certified and tested to withstand at least a 300-pound load when used 81 as an emergency stretcher or drag. This evacuation device shall be properly secured to the bus in a location to be determined by the purchaser.

Note: This only applies to buses manufactured on/after July 1, 2017

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## 9.I. Two-Way Communication

- ❖ MSS 169.4504

All vehicles used to transport a disabled student(s) shall have two-way communications.

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## 9.J. Wheelchair Tie Down and Occupant Restraint System (WTORS)

- ❖ MSS [169.4501](#) and [299A](#)
- ❖ 49 CFR [38.23](#)
- ❖ FMVSS [222](#)
- ❖ SAE J2249

For purposes of understanding the various aspects and components of this section, the terms "securement" and "tie down" and the phrases "securement system" or "tie down system" are used exclusively in reference to the devices that anchor the wheelchair to the vehicle. The term "restraint" and the phrase "restraint system" are used exclusively in reference to the equipment that is intended to limit the movement of the wheelchair occupant in a crash or sudden maneuver. The term "wheelchair tie down and occupant restraint system (WTORS)" is used to refer to the total system that secures the wheelchair and restrains the wheelchair occupant.

Wheelchair securement devices installed in any vehicle must be maintained in working order and according to the manufacturer's recommendations.

### A. WTORS General Requirements

1. A wheelchair tie down and occupant restraint system installed in specially equipped school buses shall be designed, installed and operated for use with forward-facing wheelchair-seated passengers and shall comply with all applicable requirements of [FMVSS 222, School Bus Passenger Seating and Crash Protection](#) and SAE J2249, Wheelchair Tie down and Occupant Restraint Systems for Use in Motor Vehicles.
  2. The WTORS, including the anchorage track, floor plates, pockets or other anchorages, shall be provided by the same manufacturer or shall be certified to be compatible by manufacturers of all equipment/systems used.
  3. Wheelchair securement positions shall be located such that wheelchairs and their occupants do not block access to the lift door.
  4. A device for storage of the WTORS shall be provided. When the system is not in use, the storage device shall allow for clean storage of the system, keep the system securely contained within the passenger compartment, provide reasonable protection from vandalism, and enable the system to be readily accessed for use.
  5. The WTORS, including the storage device, shall meet the flammability standards established in [FMVSS 302, Flammability of Interior Materials](#).
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6. The following information shall be provided with each vehicle equipped with a securement and restraint system:
    - a. A phone number where information can be obtained about installation, repair and parts. (Detailed written instructions and a parts list shall be available upon request.)
    - b. Detailed instructions regarding use, including a diagram showing the proper placement of the wheelchair/mobility aids and positioning of securement devices and occupant restraints, including correct belt angles.
  7. The WTORS manufacturer shall make training materials available to ensure the proper use and maintenance of the WTORS. These may include instructional videos, classroom curriculum, system test results or other related materials.
- B. Wheelchair Securement/Tiedown: See [FMVSS 222, S5.4.1, S5.4.2](#). Each wheelchair position in a specially equipped school bus shall have a minimum clear floor area of 30 inches laterally by 48 inches longitudinally. Additional floor area may be required for some wheelchairs. Consultation between the user and the manufacturer is recommended to ensure that adequate area is provided.
- C. Check for a Type II seat belt assembly with an upper torso portion at each wheelchair position (See [FMVSS 222, S5.4.3 and S5.4.4](#)). If the upper torso belt anchorage is higher than 44 inches measured from the vehicle floor, an adjustment device, as part of the occupant restraint system, shall be supplied as a part of the occupant restraint system – NSTSP.

Alterations that would return the vehicle to conventional passenger seating (removal of all wheelchair securement devices) must include removal of the power lift and rendering the special service door inoperable unless the special service door meets the emergency exit requirements.

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## 9.K. Specially Equipped Bus Inspection Procedure

- A. Visually inspect and operate wheelchair lift to ensure proper function as designed. Inspect for any leaks that would hinder the operation of the lift.
  - B. Inspect all safety systems of the wheelchair lift (e.g., hand rails, ramp stops, etc.) and ensure that they are functioning as designed and in compliance with FMVSS 403 and 404.
  - C. Ensure that all pinch points are protected from seated passengers.
  - D. Visually inspect all wheelchair and occupant securement devices to ensure none are missing or broken and that straps are not frayed/cut.
  - E. Ensure that all components for each wheelchair position are compatible in accordance with manufacturers' specifications.
  - F. Visually and physically inspect all anchorage points, tracking and fasteners for securement.
-

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## 10. Type III School Bus

This section applies to Type III vehicles used for the transportation of school children when owned and operated by a school district or privately owned and operated. All related equipment provided on the vehicle must comply with federal motor vehicle safety standards where applicable. If no federal standard applies, equipment must be to manufacturer's standard.

The following sections are specific to Type III buses and shall be inspected accordingly (see [MSS 169.454](#)).

Item/Method of Inspection	
<b>10.A. Color</b>	A Type III vehicle must be painted a color other than NSBY.
<b>10.B. Emergency Equipment (Type III)</b>	
<b>10.B.1. Fire Extinguisher</b>	A minimum of a 10-BC rated dry chemical-type fire extinguisher is required. The extinguisher must be mounted in a bracket, be located in the driver's compartment, and be readily accessible to the driver and passengers. A pressure indicator is required and must be easily read without removing the extinguisher from its mounted position.
<b>10.B.2. First Aid Kit and Body Fluid Cleanup Kit</b>	A minimum of a 10-unit first aid kit and a body fluids cleanup kit are required. They must be contained in removable, moisture- and dust-proof containers mounted in an accessible place within the driver's compartment and must be marked to indicate their identity and location.  Note: reference 10 Unit column in Chart 1 in <a href="#">7.B.1</a> .
<b>10.B.3. Safety Equipment Location Alternative</b>	❖ <a href="#">MSS 169.454 subdivision 12</a>  Type III vehicles may carry the required emergency equipment in the trunk or cargo area of the vehicle if a label in the driver and front passenger area clearly indicates the location of these items.
<b>10.C. Identification</b>	The vehicle must not have the words "school bus" in any location on the exterior of the vehicle, or in any interior location visible to a motorist.
<b>10.D. Lamps and Signals</b>	Installation and use of the eight-lamp warning system is prohibited. All lamps on the exterior of the vehicle must conform with and be installed as required by <a href="#">FMVSS 108</a> .
<b>10.E. Mirrors</b>	A. Line of vision must not be distorted, discolored, flaking or cracked.

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- B. Two exterior clear rearview mirrors must be provided, one to the left and one to the right of the driver. Each mirror must be firmly supported and adjustable to give the driver a clear view past the left rear and the right rear of the bus.
  - C. The interior clear rearview mirror must afford a good view of pupils and roadway to the rear.
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## **10.F. Stop Signal Arm**

Installation and use of a stop signal arm is prohibited.

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## **10.G. Vehicle Age**

Vehicles 12 years or older must not be used as a Type III school bus to transport schoolchildren, and no inspection will be performed on a Type III vehicle that has reached its 12<sup>th</sup> anniversary. The age of the vehicle is determined by the date of manufacture located on the VIN or certification sticker.

This standard age does not apply to vehicles manufactured to school bus standards ([FMVSS 222](#)) that are manufactured for 10 or fewer passengers and whose GVWR is 10,000 lbs. or less.

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# School Bus Inspection Manual

## Out Of Service Criteria

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### 11. Out Of Service Criteria

#### **STATE INSPECTION PROGRAMS**

School bus safety programs vary greatly from state to state. Each state is urged to establish a neutral third-party inspection program. Personnel conducting school bus safety inspections must be knowledgeable in the mechanical components of a school bus and be aware of all the applicable construction standards, laws, rules and all other requirements of their jurisdiction.

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#### **INSPECTION PROCEDURE**

School bus safety inspections should consist of a standardized inspection where vehicles are placed out-of-service based on uniform criteria. States should also develop specific inspection regulations, rules, procedures and out-of-service criteria for all vehicles utilized in student transportation. States are encouraged to develop a system to compile the data for analysis.

#### **OUT-OF-SERVICE CRITERIA**

The purpose of criteria is to identify critical school bus components and provide tolerances that inspectors can utilize to determine if a school bus is safe for student transportation. While it is recognized that each state may enforce more stringent standards, this document is intended to establish a baseline for inspecting and placing school buses out-of-service.

#### **RESOURCE INFORMATION**

49 CFR PARTS 570.1-570.63, *Vehicle in Use Inspection Standards*

49 CFR PARTS 400-599, *Federal Motor Vehicle Safety Standards*

49 CFR PARTS 393, 396, *Federal Motor Carrier Safety Regulations*

49 CFR APPENDIX G to Subchapter B, *Minimum Periodic Inspection Standards*

Commercial Vehicle Safety Alliance (CMVSA), *North American Uniform Out-of-Service Criteria*



# School Bus Inspection Manual

## Out Of Service Criteria

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### **BODY EXTERIOR**

- A. Any panel, rub rail or trim that is loose, torn, dislocated or protruding from the surface of the bus, creating a hazard (393.203); or
- B. Any engine, battery or other door that is not properly secured (393.203).

### **BODY INTERIOR**

#### **Aisle**

- A. Aisle does not have the required clearance (571.217); or
- B. Obstructions in aisle that prevent passengers from egress to emergency exits (393.62) (393.203).

#### **Door (Entrance)**

- A. Student entrance door does not open or close properly;
- B. Door control handle does not lock in the closed position; or
- C. Door is equipped with a padlock or similar locking device (excludes interlock systems).

#### **Floor**

Floor not maintained to prevent slipping or tripping by passenger(s).

#### **Handrail**

- A. Handrail loose or missing; or
- B. Handrail fails the nut/drawstring test as defined by NHTSA.

#### **Panels**

Any panel (e.g., ceiling, side or wheel well) protruding, having sharp edges or not secured so is likely to cause injury.

#### **Seat (Driver)**

- A. Driver seat is not securely fastened to vehicle and/or fails to maintain adjusted position (393.93); or
- B. Any part of the driver's safety restraint assembly is missing, not properly installed or defective as to prevent proper securement of occupant [393.93(a)(b)] (571.209).

#### **Seat(s) and Barrier(s)**

- A. Any seat or barrier that is not securely attached to the vehicle (393.91);
- B. Any seat or barrier material(s) that compromises the integrity of compartmentalization and occupant protection (571.222); or
- C. Seat spacing fails to comply with 571.222.

# School Bus Inspection Manual

## Out Of Service Criteria

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### Stepwell

- A. Any part of the stepwell or support structure that is damaged; or
- B. Any part of the stepwell tread that is loose, torn or damaged that would present a tripping hazard.

### BRAKE SYSTEM(S)

#### Adjustment

Any one brake beyond the adjustment limit (See Table 1: Brake Adjustment Specifications.)

#### Air System

- A. Absence of effective braking action upon application of service brakes [393.48 (a)]©;
- B. Audible air leak at chamber (e.g., ruptured diaphragm, loose chamber clamp, etc.) [386.3(a)(1)]©;
- C. If an air leak is discovered and either the primary or secondary reservoir pressure is not maintained when these conditions exist [396.3(a)(1)]©:
  - 1. Governor is cut-in;
  - 2. Reservoir pressure is between 80-90 psi;
  - 3. Engine is at idle; and
  - 4. Service brakes are either fully applied or released; or
- D. ABS malfunction indicator light not functioning as designed or illuminated on all ABS required vehicles.

#### Axle Brakes, General

- A. Chamber size mismatched on axle [393.47(b)];
- B. Mismatched brake chamber long stroke verses regular stroke [393.47(b)]; or
- C. Mismatched slack adjuster length [393.47(c)].

#### Brake Shoe/Pad/Lining

- A. Any lining thickness less than allowed by 393.47;
- B. Lining pad is cracked, broken, not firmly attached or missing (393.47) (*surface or heat cracks in the lining should not be considered out of service*);
- C. The friction surface of drum, rotor or friction material are contaminated by oil, grease or brake fluid (393.47)©;
- D. Loose or missing component (e.g., chambers, spiders, support brackets) (393.47);
- E. Fails to make contact with drum/rotor (e.g., frozen, binding, uneven) [393.48(a)];
- F. Absence of braking action on any axle (e.g., failing to move upon application of a wedge, S-cam, cam or disc brake);

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- G. Rotor or drum has evidence of metal to metal contact on the friction surface [393.47(d)(1)]©; or
- H. Brake pad, lining or shoe missing [393.47(a)].

### Drums/Rotors

- A. External crack(s) that open upon application [393.47(a)]©; or
- B. Any portion of the drum or rotor (discs) missing, broken, misplaced or cracked through rotor to center vent [393.47(a)].

### Hoses and Tubing

- A. Brake hose with any damage extending through the outer reinforcement ply [393.45(a)]©;
- B. Audible leak at other than a proper fitting or connection [393.45(a)]©;
- C. Any bulge or swelling when brakes are applied [393.45(a)]©;
- D. Any restriction due to cracked, broken or crimped line/hose [393.45(a)]©; or
- E. Any line, tubing, hose or connection that is not constructed to meet standard (571.106).

### Hydraulic Brake System

- A. System brake failure light or low fluid light on or inoperative (393.51);
- B. Reservoir is below minimum level [393.45(a)] (571.106)©;
- C. Any seeping, leaking or swelling of hose(s) under pressure [393.45(a)]©;
- D. Any leak in master cylinder unit [393.45(a)] (571.106);
- E. Any observable fluid leak in the brake system;
- F. Brake failure warning system is missing, inoperative, disconnected, defective, or activated while the engine is running with or without brake application [393.51(b)];
- G. ABS malfunction indicator light not functioning as designed or illuminated on all ABS required vehicles.

### Parking Brake

- A. Fails to hold vehicle in stationary position on normal roadway conditions (absence of ice or snow) in forward or reverse (393.41) [571.105 S5.2.1 and S5.2.3(b)]; or
- B. Parking brake warning lamp fails to function as designed.

### Pedal Reserve

- No pedal reserve with engine running [393.40(b)].

# School Bus Inspection Manual

## Out Of Service Criteria

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### **Power Assist Unit**

Fails to operate [396.3(a)(1)].

### **BUMPERS**

- A. Front bumper is missing or not properly secured [393.203(e)]; or
- B. Rear bumper is missing or not secured (393.86).

### **CHASSIS/FRAME/UNIBODY**

- A. Any cracked, loose, sagging or broken frame side rail [393.201(a)]©;
- B. Any damage permitting the shifting of the body or imminent collapse of frame [393.201(a)]©; or
- C. Any cracked, loose, broken frame member affecting support of functional components (e.g., steering gear, engine, transmission, body part of suspension [393.201(a)]©.

### **Crossmembers**

- A. Any crossmember, outrigger or other structural support which is cracked, missing or deformed that affects the structural integrity of the vehicle (393.201);
- B. Three or more adjacent crossmembers broken or detached (393.201); or
- C. Any area of the floor that is sagging or soft due to broken crossmembers (393.201).

### **Outriggers/Body Supports**

Any crossmember, outrigger or other structural support which is cracked, missing, deformed or has rust holes where damage affects the safe operation of the vehicle.

### **DIFFERENTIAL**

Cracked or leaking housing [393.207(a)].

### **DRIVESHAFT**

- A. Driveshaft guard loose, missing, improper placement or bent (393.89); or
- B. Universal joint(s) worn or faulty, or obvious welded repair [393.209(2)(d)].

### **ELECTRICAL/BATTERY**

#### **Battery**

- A. Battery not secured (393.30);
- B. Signs of leaking or excessive corrosion; or
- C. Battery lacks cranking capacity to start engine.

#### **Cables**

- A. Electrical cable insulation chafed, frayed, damaged or compromised insulation burnt, causing bare cable to be exposed [393.28, 396.3(a)(1)]©;

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- B. Loose or corroded connections at battery posts or compromised insulation protection to electrical components [393.28, 393.77(b), 396.3(a)(1)]; or
- C. Missing or damaged protective grommets insulating main electrical cables through metal compartment panels (393.30)©.

### Components

- A. Broken or unsecured mounting of electrical components [396.3(a)(1)]©; or
- B. Electrical cable unsupported, hanging or missing clamps that may cause chafing or frayed conditions [393.28, 396.3(a)(1)]©.

### EMERGENCY EQUIPMENT

- A. Fire extinguisher missing, not of proper type or size, not fully charged, has no pressure gauge, is not secured or is not readily accessible to the driver or passengers (393.95);
- B. Any additional state-specific equipment (e.g., first aid kit, body fluid kit, webbing cutter and emergency reflectors) that fails to meet state specifications and places the vehicle out of service; or
- C. Missing emergency triangles (571.125).

### EMERGENCY EXITS

- A. Any emergency door, window or roof hatch that fails to open freely or completely as defined in 571.217;
- B. Door prop-rod device is missing or inoperative (571.217);
- C. Any emergency exit is equipped with a padlock or similar locking device (excludes interlock systems);
- D. Any vehicle that lacks the required number of emergency exits (571.217);
- E. Any emergency exit that is not properly labeled and marked both inside and outside the vehicle as specified by 571.217;
- F. Any item or modification that reduces the size of the opening and limits egress to the emergency exit by all passengers; or
- G. Emergency exit warning device is not audible in the driver seating position and the vicinity of the emergency door or window (571.217).

### ENGINE

- A. Any critical component that fails to function as designed (396.3); or
- B. Any fluid leak that would affect the safe operation of the vehicle (396.3).

### EXHAUST SYSTEM

- A. The exhaust system is leaking or discharging directly below or at a point forward of the driver or passenger compartment [393.83(g)]©; or

**Note:** Does not apply to proper venting for emission systems.

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- B. No part of the exhaust system shall be located and likely to result in burning, charring or damaging the electrical wiring, the fuel supply or any combustible part of the vehicle [393.83(a)]©.

### FUEL SYSTEM

#### CNG or LPG Fuels©

- A. Any fuel leakage from the CNG or LPG system detected audibly or by smell and verified by either a bubble test using non-ammonia, non-corrosive soap solution, or a flammable gas detection meter [396.3(a)(1)].

Note: Verification is needed to ensure that the sound is not either internal to the fuel system (such as gas flowing in a pressure regulator, or pressure equalizing between manifold tanks) or a leak in the air brake system.

- B. Any fuel leakage from the CNG or LPG system detected visibly (evidence such as ice buildup at fuel system connections and fittings) and verified by either a bubble test using non-ammonia, non-corrosive soap solution, or a flammable gas detection meter [396.3(a)(1)].

Note: Some brief fuel leakage or decompression may occur during refueling, causing temporary frosting of CNG or LPG fuel system parts. If the vehicle has been refueled shortly before inspection, care must be taken to distinguish these temporary frosting occurrences from actual leaks.

#### Liquid Fuels

- A. Any part of the fuel tank or fuel system not securely attached to the vehicle (393.65);
- B. A fuel system with a dripping leak at any point (393.67 Tank)©;
- C. Dripping leak (396.3(a)(1) leak other than tank)©; or
- D. Missing fuel cap or system does not seal as designed©.

#### LAMPS/SIGNALS

- A. Any one of the following lamps that is not working: brake, turn signal, tail, head (low beam), school bus overhead warning light (amber or red), hazard warning or stop arm lamp (571.108, 571.131);

**Note:** vehicle LED lamps must have more than 25% of the diodes unlit to be considered not working.

- B. Horn fails to function as designed (393.81);
- C. Any critical brake, telltale lamp, buzzer or gauge that fails to function as designed;
- D. Required stop arm(s) fail to operate with overhead red lights as mandated (571.131); or
- E. If equipped, a crossing control device fails to extend and retract as designed.

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### **MIRRORS (571.111)**

- A. Any mirror required to provide the driver with the entire field of view, missing, damaged, clouded or otherwise obscured so as to place children in a hazardous position;
- B. Any crossover mirror system or portion thereof that fails to hold a set adjustment;
- C. Any crossover mirrors directed to view any area other than for which they were intended; or
- D. Any part of the required field of vision obscured or not visible from the driver's seated position.

### **STEERING SYSTEM**

#### **Ball/Socket Joints©**

- A. Any movement under steering load of a nut stud [396.3(a)(1)];
- B. Any motion, other than rotational, between any linkage member and its attachment point of more than 1/8 inch measured with hand pressure only [393.209(d)]; or
- C. Any obvious welded repair [393.209(d)].

#### **Front Axle Beam©**

Any crack(s) or obvious welded repair [396.3(a)(1)].

#### **Nuts ©**

Loose or missing fasteners on tie rod, pitman arm, drag link, steering arm or tie rod arm [396.3(a)(1)].

#### **Pitman Arm©**

- A. Looseness of the pitman arm on the steering gear output shaft [393.209(d)]; or
- B. Any obvious welded repair [396.3(a)(1)] [393.209(d)].

#### **Power Steering**

- A. Auxiliary power assist cylinder loose [393.209(e)];
- B. Power steering system belts frayed, cracked or slipping [393.209(2)(e)]; or
- C. Power steering system leaking or insufficient fluid in reservoir [393.209(2)(e)].

#### **Steering**

- A. Any modification or condition that interferes with free movement of any steering component [393.209(d)]©; or
- B. Steering travel restricted through the limit of travel in both directions [570.60(c)].

#### **Steering Column/Wheel©**

- A. Absence or looseness of U-bolts or other positioning part(s) [393.209(c)];

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- B. Welded or repaired universal joint(s) [393.209(d)];
- C. Steering wheel not properly secured [393.209(a)]; or
- D. Steering wheel lash/free play exceeds performance test (see Table #2) [393.209(b)].

### Steering Gear Box©

- A. Mounting bolt(s) loose or missing [393.209(d)];
- B. Crack(s) in gearbox or mounting brackets (393.209(d)) [396.3(a)(1)];
- C. Any obvious welded repair(s) [396.3(a)(1)] [393.209(d)]; or
- D. Looseness of yoke-coupling to the steering gear input shaft [393.209(d)].

### Tie Rods/Drag Links©

- A. Loose clamp(s) or clamp bolt(s) on tie rod or drag link(s) [396.3(a)(1)]; or
- B. Any looseness in any threaded joint [396.3(a)(1)].

## SUSPENSION COMPONENTS

### Air Suspension©

- A. Deflated air suspension (one or more deflated air spring/bag) [393.207(f)]; or
- B. Air spring/bag is missing, broken, or detached at either the top or bottom (393.207(f)).

### Axle Parts/Members

- A. Any U-bolt or other spring to axle clamp bolt(s) which are cracked, broken, loose or missing [393.207(a)]©;
- B. Any axle, axle housing, spring hanger(s), or other axle positioning parts which are cracked, broken, loose or missing that results in shifting of an axle from its normal position [393.207(a)]© ;
- C. Any worn (beyond manufacturer specifications) or improperly assembled U-bolt, shock, kingpin, ball joint, strut, air bag or positioning component [570.61 (a)];
- D. Any spring hanger, assembly part or portion of leaf which is broken, separated or missing [393.207(c)]©; or
- E. Any broken coil spring [393.207(d)]©.

## TIRES/WHEELS/HUBS

### Hub

- A. Excessive wheel bearing or kingpin play that exceeds ¼ inch [396.3(a)(1)], (570.61);
- B. Any bearing (hub) cap, plug, or filler plug that is missing or broken, allowing an open view into hub assembly [396.3(a)(1)];



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- C. Smoking from wheel hub assembly due to bearing failure [396.3(a)(1)];
- D. When any wheel seal is leaking. This must include evidence of contamination of the brake friction material [396.5(b)];  
Note: Grease/oil on the brake lining edge, back of shoe, or drum edge and oil stain with no evidence of fresh oil leakage are not conditions for an out-of-service violation.
- E. Lubricant is leaking from the bearing hub and is accompanied by evidence that further leakage will occur [396.5(b)]; or
- F. No visible or measurable of lubricant showing in bearing hub [396.5(a)].

### Tires

- A. Any sidewall cut, worn or damaged to the extent that the steel or fabric cord is exposed [393.75(a)]©;
- B. Any observable bump, bulge or knot related to sidewall or tread separation [393.75(a)]©;
- C. Tire is flat or has noticeable leak [393.75(a)(3)]©;
- D. Any front tire worn to less than  $\frac{4}{32}$  inch [393.75(b)];
- E. Any rear tire worn to less than  $\frac{2}{32}$  inch [393.75(c)];
- F. Any school bus operated with regrooved, recapped or retreaded tires on the front axle [393.75(d)]; or
- G. Any tire not of proper type (e.g., load range, size, mismatched on axle).

### Wheels/Rims/Spiders

- A. Any nuts, bolts, studs, lugs or holes that are elongated, broken, missing, damaged or loose [393.205(b)];
- B. Any cracked or broken wheel or rim [393.205(a)]; or
- C. Any lock or slide ring broken, cracked, improperly seated, sprung or has mismatched rings [393.205(a)]©.

### WHEELCHAIR LIFT-EQUIPPED VEHICLES

- A. Wheelchair lift does not function as designed or is inoperable;
- B. Platform lift manufactured after April 1, 2005 must meet all the following criteria, (as referenced in FMVSS 403 and 404):
  - 1. Jacking prevention;
  - 2. Manual backup operating mode;
  - 3. Interlocks to prevent forward or rearward mobility of the vehicle unless lift is stowed and lift doors are closed;

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4. Wheelchair retention device; and
  5. Platform outer barrier, inner roll stop and threshold warning device.
- C. Any hydraulic line leaking during lift operation;
- D. Wheelchair restraint system is missing, incomplete or improperly installed, loose, damaged or does not adhere to the securement manufacturer's recommendations; or
- E. Any required wheelchair occupant restraint system not in compliance (571.222).

### **WINDOWS**

- A. Any glass or glazing that is broken through or missing (393.60);
- B. Any glass not of approved type [393.60(a)];
- C. Windshield has discoloration or other damage in that portion extending upward from the height of the topmost portion of the steering wheel but not including a two-inch border at the top and a one-inch border at each side of the windshield or each panel thereof, except as follows:
1. Color or tint applied by the manufacturer for the reduction of glare;
  2. Any crack not over  $\frac{1}{4}$  inch long, if not intersected by another crack;
  3. Any damaged area that can be covered by a disc  $\frac{3}{4}$  inch in diameter, if not closer than three inches to any other such damaged area; and
  4. Any damage to the driver's side area window(s) or chips, clouding or cracks that obscure the driver's vision [393.60©]; or;
- D. No operable defrosting and defogging system to clear the driver's windshield (571.103).

### **WINDSHIELD WIPERS**

- A. Inoperative, missing or damaged wiper (393.78); or
- B. Wiper does not clean sweep area of driver's windshield (393.78).

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