

NC BUS FLEET: *North Carolina* ***School Transportation Fleet Manual***

School Bus Inspections

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INTRODUCTION

North Carolina school children deserve the safest transportation possible. A well-maintained school bus driven by a well-trained professional bus driver helps ensure their safety. The state's fleet of school buses is kept safe through the work and dedication of thousands of employees of local education agencies (LEAs). The North Carolina Department of Public Instruction (DPI) Transportation Services section works in partnership with these LEAs, providing consultation on school bus transportation and administering the resources needed for school bus operations.

This manual provides requirements and guidance related to the fleet of school buses and service vehicles. It includes:

- Vehicle Purchase, Replacement and Disposal
- Preventive Maintenance
- Vehicle Inspection

NOTE: THIS PRINTING CONTAINS ONLY THE VEHICLE INSPECTION PORTION

Vehicles

The State Board of Education is given statutory authority to fund public school transportation operations and the replacement of vehicles. Specifically, it is the responsibility of the State Board of Education to periodically

***"...adopt such rules and regulations with reference to the construction, equipment, color, and maintenance of school buses. No school bus shall be operated for the transportation of pupils unless such bus is constructed and maintained as presented in such regulations."
North Carolina General Statute 115C-240(c)***

The statute assures that public school buses throughout the State are built to the same standards and are uniform in appearance. DPI Transportation Services works in partnership with the Department of Administration, Division of Purchase and Contract, to establish a statewide term contract for vehicles meeting the specifications developed by a statewide Vehicle Specifications Committee. At any time, the latest version of this document standardizes the construction and equipment to be included on North Carolina school buses. This authority does not extend to private contractors that may provide school bus transportation to a local LEA. School buses operated by private contractors should meet all federal motor vehicle safety standards (FMVSS's) applicable to school buses. Similarly, school buses and activity buses owned by an LEA which are not subject to state replacement must also meet all FMVSS's for school buses or multi-function school activity buses.

The purchase of an initial school bus or service vehicle is the responsibility of the LEA. These vehicles are then replaced at state expense after having reached specified mileage or time criteria. In order to be eligible for state replacement, a vehicle must be used only for purposes allowed by general statute and must be maintained as prescribed in this manual. Funds generated from the sale of surplus vehicles are returned to the state fund used to purchase new (replacement) vehicles.

Because the State is responsible for replacing school buses, no school bus is to be altered in appearance, color, lettering, or equipment unless authorized by the Department of Public Instruction, Transportation Services Section. In general, items that are included in subsequent year specifications may be retrofitted to older model buses. Additional equipment may be added to school buses as described on page **Error! Bookmark not defined.** "Alterations and Modifications to School Buses" of this manual. It is important that the installation of new equipment or alteration of appearance

be coordinated through and approved by DPI Transportation Services to ensure the integrity and longevity of the fleet.

Preventive Maintenance

Essential preventive maintenance activities provide a uniform standard necessary to ensure a safe transportation environment for the students in the Public Schools of North Carolina. It is each LEA's responsibility to maintain school buses as described in this manual. While the maintenance programs presented in this manual represent the minimum requirements for all school buses and service vehicles, more frequent service may be warranted at times. The purpose of the maintenance programs outlined herein is to promote repair consistency and cost efficiency, and to assure that school buses and service vehicles are maintained in safe operating condition.

This manual is used in conjunction with the state's system for fleet management – the Business Systems Information Portal (BSIP), a project of the North Carolina Department of Transportation (NCDOT). BSIP is an online information system through which 100 school bus garages are provided access to their fleet maintenance data. The bus garages share the system with NCDOT and the State Highway Patrol. Data entered by the users are updated in real time and scheduled maintenance activities are reported on a daily basis. The principal areas addressed by BSIP are as follows:

- Vehicle replacement status and basic identifiers (e.g. warranty date, VIN)
- Preventive maintenance and inspection scheduling
- Inventory management for repair parts, fuel and tires
- Vehicle maintenance and repair costs histories

Timely updating of fleet maintenance data in BSIP is a critical component of proper preventive maintenance.

School Bus Inspections

North Carolina General Statute 115C-248(a) states the following:

“The superintendent of each local school administrative unit, shall cause each school bus owned or operated by such local school administrative unit to be inspected at least once each 30 days during the school year for technical defects or other defects which may affect the safe operation of such bus.”

Every 30 calendar days, each school bus (and activity bus) is required to be inspected for mechanical or safety-related defects. This manual outlines a consistent set of items to be inspected on each school bus. Further, criteria that require a bus be placed “out of service until repaired” are provided so that each inspector has a consistent process by which to assess a bus during the inspection.

Effective August 1, 2011, LEAs shall require each 30-day inspection required under G.S. 115C-248 to be conducted by an individual who has completed the training and certification requirements administered by the Department of Public Instruction. (State Board of Education Policy TCS-H-011).

The success of this maintenance program will be assured through the cooperation of all LEA transportation employees. Assignment of personnel to the prescribed duties listed in this manual is essential in order for the preventive maintenance program to function properly and to be cost efficient. The prescribed school bus garage operational procedures should be followed as closely as possible.

While state funds are allocated for the replacement and maintenance of school buses, it is the responsibility of the LEA to provide facilities and equipment. This is outlined in General Statute 115C-249 (Purchase and Maintenance of School Buses). Section (e) reads as follows:

"It shall be the duty of the county board of education to provide adequate buildings and equipment for the storage and maintenance of all school buses and service vehicles owned or operated by the board of education of any local school administrative unit in such county. It shall be the duty of the tax-levying authorities of such county to provide in its capital outlay budget for the construction or acquisition of such buildings and equipment as may be required for this purpose."

Additional information concerning NC school bus transportation can be obtained online at www.ncbussafety.org.

Questions regarding the contents of this manual should be directed to DPI Transportation Services at 919.807.3570 (www.ncbussafety.org/contact.html).

30 DAY INSPECTION MANUAL

Introduction

This section of the manual has been developed for those engaged in school bus or activity bus inspection with the goal of inspection uniformity thereby increasing the likelihood that fewer buses will be operated in an unsafe condition.

A committee from a variety of Federal & State resources developed the regulations described herein. North Carolina General Statute 115C-248(a) states the following:

“The superintendent of each local school administrative unit shall cause each school bus owned or operated by such local school administrative unit to be inspected at least once each 30 days during the school year for technical defects or other defects which may affect the safe operation of such bus.”

This means that each school and activity bus being operated is required to have an inspection every 30 (calendar) days. Furthermore, in cases where a vehicle was not in operation and has not been inspected in the past 30 days, that bus must have a 30-day inspection completed prior to any students being transported on it. A computer database operated by the state schedules buses for inspection and causes them to appear 10 days before they exceed the required 30-day interval. This should give inspectors ample time to conduct the inspection before they are in violation of N.C.G.S 115C-248(a). (From this point forward, activity buses are referred to as school buses.)

Effective August 1, 2011, LEAs shall require each 30-day inspection required under G.S. 115C-248 to be conducted by an individual who has completed the training and certification requirements administered by the Department of Public Instruction. (State Board of Education Policy TCS-H-011).

At any time a lone inspector is outside or underneath a bus, a lock out/tag out procedure must be used when inspecting or servicing a bus. A highly visible tag must be secured to or near the ignition key to prevent the bus from being operated while being serviced/ inspected. This procedure will also keep the bus from being operated if the bus inspector must leave the vehicle before the repair/inspection is completed.

The 30-day inspection is the backbone of the school bus Preventive Maintenance Program. If transportation personnel will thoroughly pursue the following description of a 30-day inspection, the procedures in the remaining preventive maintenance sections of this manual will be easier to perform on the entire transportation fleet.

Any questions, comments, or inquiries regarding this inspection manual shall be directed to the North Carolina Department of Public Instruction, Transportation Services Section. Phone # 919-807-3570

All North Carolina School Systems may copy and reproduce this document for their personnel. Anyone else wishing to copy this manual must contact the North Carolina Department of Public Instruction, Transportation Services Section.

A copy of this manual must be present during each 30-day inspection.

30-Day Inspection Scheduling

School bus inspections are scheduled through NCDOT's Bus Systems Information Portal (BSIP). Inspect buses as they appear on the ZIP24 Maintenance Scheduling screen. For each bus BSIP will generate a DP02, 30-day inspection, work order 10 days before its due date. That due date is determined by the reference date set when technically completing the previous 30-day inspection. On any assigned day of any month that buses are operated (weather permitting), a technician(s) designated by the foreman or director, will inspect all items listed on the BSIP work order.

To complete the 30-day inspection, the inspector, will completely inspect and road test each bus due a 30-day inspection. All defects should be recorded on the BSIP work order and scheduled for repairs as soon as possible. If two or more inspectors are performing an inspection, each inspector shall initial, on the work order, the items inspected by them personally. (An individual assisting in an inspection – e.g. operating lights, steering and brakes for the inspector – does not have to initial the form.) **Any defects that would place the bus out of service should be repaired before the vehicle is operated again which may mean that a spare must be called to take its place.**

On all buses equipped with air brakes, the travel of the air chamber push rods (front and rear) shall be measured at this time, recorded on the work order, and noted to replace slack adjusters if needed per manufacturer's specifications listed in the Brake section on page 59.

A sample ZIP24 maintenance scheduling screen is shown below. It is important to note that the "Planned Date" field on this screen, and at the top of the actual BSIP 30-day inspection document, indicates the day that the inspection is due. Once the inspection is completed and entered into BSIP the NEXT inspection will be due (Planned Date) 30 days after the reference date that was set.

The screenshot shows the SAP Maintenance Scheduling Overview List. The table contains the following data:

Plnd. date	Maintenance item description	Order	Sort field	Work Order Status	MntPlan	Equipment
03/17/2006	6008-0597: Bus 30-Day	62000744818		REL PRT NMAT PRC	66622	62013703
	6008-8102: Bus 30-Day	62000744036		REL PRT NMAT PRC	59684	62015924
	6008-0140: Bus 30-Day	62000744070		REL PRT NMAT PRC	59566	62015972
	6008-0190: Bus 30-Day	62000744033		REL PRT NMAT PRC	59666	62015980
	6008-0121: Bus 30-Day	62000744072		REL PRT NMAT PRC	59527	62015987
	6008-8101: Bus 30-Day	62000744035		REL PRT NMAT PRC	59683	62016424
	6008-0168: Bus 30-Day	62000744069		REL PRT NMAT PRC	59624	62016474
	6008-0132: Bus 30-Day	62000744075		REL PRT NMAT PRC	59548	62016487
	6008-8109: Bus 30-Day	62000744061		REL PRT NMAT PRC	59690	62016922
	6008-0175: Bus 30-Day	62000744064		REL PRT NMAT PRC	59641	62017480
		62000744034		REL PRT NMAT PRC	59670	62017976
		62000744063		REL PRT NMAT PRC	59629	62018480
		62000744074		REL PRT NMAT PRC	59543	62018987
		62000744039		REL PRT NMAT PRC	59686	62019923
	6008-0182: Bus 30-Day	62000744067		REL PRT NMAT PRC	59648	62019980
	6008-0195: Bus 30-Day	62000744528		REL PRT NMAT PRC	115802	62109502
03/19/2006	6008-0593: Bus 30-Day	62000747067		REL PRT NMAT PRC	66598	62010704

A callout bubble points to the 'Plnd. date' column with the text: "Planned date is due date".

30-Day Inspection Processes

This section is designed to describe the necessary processes surrounding the 30-day inspection that must be followed. It covers paperwork/business processes while leaving the technical aspects to the discretion of the inspector. The inspector should receive (or print out) the DP02 work order from BSIP. That sheet will contain information about the vehicle, the work order number, and the date that the 30-day inspection is due.

While progressing through the 30-day inspection, the inspector should write any defects on the work order sheet. If two or more inspectors are performing an inspection, each inspector must initial on the work order beside any items inspected by them personally. The work order should be signed at the bottom by all associated inspectors and dated with the date the inspection was completed. An assistant operating lights, brakes, etc from the driver's seat need not sign the work order.

The inspector should complete the entire inspection before any repairs are made. Depending on whether repairs are assigned to the inspector/technician or to another technician, appropriate documentation of defects must be translated to repair documents.

Any repairs that do not require that the bus be taken out of service, "minor repairs", that can be repaired with the equipment available may be repaired in the field. Any parts (including fluids) and labor time associated with this field repair should be noted on a TD-18 form created for that vehicle. Once the repair is completed the technician should indicate that the defect was repaired on the DP02 work order.

Minor repairs for which parts are not available but that may be repaired in the field on a subsequent trip, shall be noted in the remarks section of the work order. The inspector should fill out a TD-18 immediately, or request a DP01 repair work order upon return to the shop. A technician should also secure the necessary parts to be able to complete the field repair on a future trip. Minor repairs which cannot be repaired in the field should be noted in the remarks section of the work order and a TD-18 or DP01 work order created and printed.

Any problems found during the inspection which would require that the bus be taken out of service, "essential repairs", that can be repaired with available parts and equipment should be repaired promptly following the inspection of that bus – before the bus is used to transport students. Any parts (including fluids) and labor time should be noted on a TD-18 form created for that vehicle. Once repaired, the technician should indicate the defect was repaired on the DP02 work order.

If a technician is unable to complete all essential repairs before the bus will transport students again, a spare should be called in for that bus. No bus may be operated to transport students with an out of service condition present.

If an essential repair can be completed in the field at a later time, a technician should make note of it on the work order and fill out a TD-18 immediately, or request a new DP01 repair work order upon return to the shop. The vehicle should be repaired as soon as possible and returned to regular service. Essential repairs which must be repaired at the garage should be noted on the 30-day inspection work order and a TD-18 or DP01 created. This repair should be worked into the schedule at the garage so that the vehicle may be returned to regular service.

The paperwork, including TD-18s, should be returned to the inspector's supervisor upon return to the garage. The supervisor should look over the paperwork and create and print the necessary DP01 work orders (if TD-18s were not created). The supervisor should then sign the work order and return it to person responsible for entering the data into BSIP.

The work order should be entered into BSIP in a timely manner, and technically completed on the IW-32 screen. **The reference date MUST be set to the date the technician indicated the 30-day**

inspection was completed. The DP02 work order should then be filed in the Individual Vehicle Inspection file. Any completed TD-18s should be entered into BSIP, and also filed appropriately.

Message to Inspectors

This section of the manual has been prepared by a statewide committee as a guideline for the proper inspection of school buses. It includes federal and state regulations and procedures identified in previous editions of this manual and others identified by the committee. These regulations and procedures are designed to provide the safest transportation possible for the precious cargo being transported by North Carolina school districts. Any deviation from these regulations and procedures could result in the injury or death of our children. The Transportation Department plays a vital role in the education and development of North Carolina's school children. By maintaining a safe school bus, the bus technician helps provide a means for a child to get to school and obtain an education.

The 30-day inspection is for the purpose of detecting any and all items which have failed, or could reasonably be expected to fail, before the next regularly scheduled monthly inspection. This publication attempts to cover a majority of the items that are required to be inspected and serviced on school buses for the 30-day inspection. Due to evolving specifications and make-up of schools buses, it would be virtually impossible to include every single item that could malfunction. *When a problem is encountered that is not covered in this manual, the safety of the bus driver, passengers and motoring public should always be the most important factor considered.* It will be up to the inspector, in consultation with the shop foreman or transportation director, to make the decision whether the bus should be allowed to stay in service or be replaced by a spare until repairs are made.

It is highly recommended that a certified inspector and an assistant inspect a school bus. The assistant will aid from the driver seat. The certified inspector will be outside of the bus to verify the different systems are functioning properly and provide documentation on the DP02 TD-30 (inspection form). The assistant may be any person – not necessarily certified - who can help the inspector check steering, brakes, and lights and need not be present for the entire inspection

At any time a lone inspector is outside or underneath a bus, a lock out/tag out procedure must be used when inspecting or servicing a bus. A highly visible tag must be secured to or near the ignition key to prevent the bus from being operated while being serviced/ inspected. This procedure will also keep the bus from being operated if the inspector must leave the vehicle before the repair/inspection is completed.

The inspection and repair of a school bus are two separate steps, which may or may not be conducted by two separate individuals.

1. The bus must be properly inspected for defects. This process should not be interrupted once an inspection has begun. The inspectors must carefully check all the items listed on the work order. If a defect is found, the problem must be noted at the proper place on the form. **No repairs shall be made until the inspection process is completed.**
2. After completing the inspection, the an inspector/technician or other assigned technician should review the defects found and repair them. A TD-18 shall be filled out to indicate repairs made. If it becomes apparent that a bus with an out-of- service defect cannot be repaired before it is to be dispatched on the next route, a spare vehicle must be secured.

The inspector should review this manual often in order to achieve the best possible results.

A detailed description of out-of-service criteria for 30-day inspections is contained in APPENDIX A of this document.

A copy of this manual must be present during each 30-day inspection.

30-Day Manual Revision Committee Members

The preparation of this section of the manual was a cooperative effort between the North Carolina Pupil Transportation Association (NCPTA) and the North Carolina Department of Public Instruction (NCDPI), Transportation Services Section. The committee would like to thank those around the state who provided input and feedback during the preparation of this manual.

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Robert Boggs	District 3	Iredell
Rick Jennings	District 3	Wilkes
Jeff Garmon	District 5	Cabarrus
Ralph Trango	District 6	Wake
Andy Barbour	District 7	Johnston
Michael Hatcher	District 7	Brunswick
David Twiddy	District 8	Dare
Frankie Floyd	District 9	Jones
Charles Ball	NCDPI	
Keith Whitley	NCDPI	
Randy Henson	NCDPI	(Committee Chair)

ex officio members:

Derek Graham	NCDPI
Craig Warren	NCDPI

30-DAY BUS INSPECTION PROCEDURES

The following sections are mandated by North Carolina General Statute 115C-248(a) and are the procedures for performing a 30-day inspection on North Carolina Public School Buses in all 100 counties.

Brakes

Inside Bus- Air Brake Component Check

Air Brakes – All of the following items shall be inspected on Air Brake Equipped Vehicles:

1. **Air Pressure Gauges** –Check for the presence of two gauges (or single gauge with dual needles). One gauge or needle should indicate air pressure available to the primary air brake system, and the other should indicate air pressure available to the secondary brake system. Both gauges must be accurate to within +/- 7% (at 100 lbs. x 7% = 7lbs.)

The vehicle shall be removed from service until repairs are made if:

- **Gauge(s) are not working.**

Note: If bus is equipped with anti-lock braking system, refer to appropriate Manufacturer's Service Manual for inspection criteria.

2. **Air Compressor Governor** – Check air brake system governor operation. While building up system air pressure, note pressure at which governor cuts-out (compressor quits compressing). With engine still running, pump brakes to lower air pressure until governor cuts-in (starts compressing again).

Repairs should be made if

- Cutout pressure is below 120 p.s.i.

The vehicle shall be removed from service until repairs are made if:

- **The cutout pressure is too low (below 100 psi).**
- **The cutout pressure is too high (above 130 psi).**

3. **Air Compressor Operation** – Air reservoir shall be drained thoroughly before making this check. Check time required for system air pressure to build up from 85 to 100 psi with engine at fast idle (approximately 1,200 RPM) Repairs shall be made if time for system buildup (85-100 psi) exceeds 40 seconds. Air compressor should also be checked for oil leaks.

4. **Parking Brake Operation- With Vehicle Stopped** (engine running), apply park brake. When engine torque is applied by placing transmission selector in "Drive" and accelerating the engine to a fast idle (approximately 1,200 rpm's) the vehicle should not move forward.

Note: Buses equipped with Rear Diesel engine and Allison World Transmission shall be checked at 900 R.P.M

The vehicle shall be removed from service until repairs are made if:

- **Park brake doesn't hold or functions improperly.**

5. **Air Leaks** – To check the vehicle for air leaks the system shall be charged to (100 psi minimum). The engine should then be turned off, and the park brake released. Make sure a wheel chock secures the vehicle to prevent any movement. With brakes in released position, check for air pressure leak (pressure drop) for at least one (1) minute. Note pressure drop, if any. Firmly apply the service brake. Do not release. Note pressure drop, if any. Make repairs:
- If air is leaking, but the rate is less than 2 psi per minute (brakes released).
 - If air is leaking but the rate is less than 3 psi per minute (service brake applied).

The vehicle shall be removed from service until repairs are made if:

- **Pressure leaks more than 2 psi per minute (brakes not applied).**
- **Pressure leaks more than 3 psi per minute (with service brake applied).**

6. **Low Air Warning** – Check operation of low air warning buzzer and light by building air pressure to 100-125 psi and perform the following procedures.
- a. Switch ignition key switch to on position.
 - b. Drop air pressure. Low air warning buzzer and light should activate by the time the pressure drops to 60 psi.
 - c. Start the engine and build system air pressure. Warning buzzer and light should deactivate by 70 psi.

The vehicle shall be removed from service until repairs are made if any of the following conditions exist:

- **Low air warning light is inoperative.**
- **Low air buzzer is inoperative.**
- **Buzzer or light fails to operate by 60 psi or continues to operate above 70 psi.**

Note: If air brake gauge failed previous check for accuracy, do not perform this check until gauge is repaired.

Inside Bus- Hydraulic Brake Component Check

1. **Hydraulic Brakes** – All of the following items shall be checked on hydraulic brake equipped vehicles:
Any visible leaks in the brake or hydraulic assist system.

The vehicle shall be removed from service until repairs are made if:

- **Any leaks are found in the brake or hydraulic system.**

Hydraulic Brake Warning Light-Check operation of hydraulic brake warning light.

The vehicle shall be removed from service until repairs are made if:

- **Warning light fails to operate.**

Check the brake warning and backup systems using the appropriate manufacturer procedure below.

Brake Failure Warning System Check	
NAVISTAR	
CONDITION	NORMAL OPERATION
PARK BRAKE LIGHT	
Key switch in START position w/park brake released – (Bulb check).	Light ON
Key switch ON w/park brake applied.	Light ON
BRAKE PRESSURE LIGHT	
Key switch OFF.	Light OFF, electric hydraulic Pump operates when service Brakes are applied.
Key switch in ON position. Engine not operating (pump and bulb check).	Light ON and electric hydraulic Pump operation (some vehicles) SEE NAVISTAR MANUAL. Light ON and electric hydraulic Pump operates when service Brakes are applied.
Key switch in START position.	Light ON momentarily and Electric hydraulic pump operates
Key switch in ON position and Engine operating with service Brakes applied.	Light OFF.

2. **Brake Pedal Reserve** (distance from floor) upon one firm brake application (engine off, hydraulic boost depleted).
The vehicle shall be removed from service until repairs are made if:
 - Brake pedal (reserve) is less than one inch from floor.
3. **Brake Pedal Fade** (continues to fall to floor after initial firm application) with engine off.
The vehicle shall be removed from service until repairs are made if:
 - There is any brake pedal fade (falling away) after initial firm application.
4. **Brake Hardware and Components** inside the bus for secure mounting, routing, and condition including pushrod and clevis assembly, brake pedal assembly and rubber cover pad (if originally equipped). Replace rubber cover if it is worn.
The vehicle shall be removed from service until repairs are made if:
 - Rubber cover pad is missing or severely worn.
5. **Emergency Brake Control Assembly.**
The vehicle shall be removed from service until repairs are made if:
 - Emergency brake control assembly is hard to operate.
 - Emergency brake control assembly doesn't latch and release properly.

Steering / Battery

Inside Bus-Steering Component Check

Check for play in the steering system (at the steering wheel) using the following procedures:

1. **Visual check** – from inside the bus with the engine running, rotate the steering wheel lightly from side to side until the turning motion is observed at the tires and note free play (lash) at the steering wheel outer diameter. This procedure must be performed with the vehicle on the ground. Repair steering wheel if cracked (plastic) or worn in the contact area.

The vehicle shall be removed from service until repairs are made if:

- **Free play (lash) exceeds the amounts specified in the chart below.**

STEERING WHEEL PLAY (LASH) MEASUREMENTS

Steering Wheel Size	Free Play (Lash) Measurements Power Assist
16" or less	4-1/2" +
18"	4-3/4" +
20"	5-1/4" +
22"	5-3/4" +

Note: For power systems, if steering wheel movement exceeds 45 degrees before steering axle tires move, proceed as follows: Rock steering wheel left to right between points of power steering valve resistance. If that motion exceeds 30 degrees the vehicle shall be placed out of service until repaired.

To check power assist operation run the engine at fast idle turning the steering wheel a full right and left turn to feel for binding, jamming, or belt slippage.

2. **Steering column** - Check steering column inside bus for up and down play (perpendicular to shaft) and for proper mounting. The firewall rubber boot should also be checked for proper seal.

The vehicle shall be removed from service until repairs are made if:

- Side-to-side play in steering column exceeds 1/4 inch or up and down play exceeds one (1) inch.
- Column assembly mounting (including floor mounting plate) or fasteners are loose.
- Tilt/telescopic assembly (if equipped) will not stay in the locked position.
- Steering column U-joint inside the bus (if equipped) is loose, damaged, or noisy after lubrication.
- Flexible coupling, if equipped (rag joint) has loose or missing fasteners, damaged flexible disc, or elongated holes.
- Any column U-joint, pinch bolt, other column fasteners, or input shaft coupling is loose, damaged, or missing.
- Steering gearbox is loose on frame, or fasteners or lock tabs are loose or missing.
- If the boot is found damaged or torn.

Outside Bus-Steering Component Check

Steering Gear Box and other external components will be checked using the following procedure:

1. Vehicle shall be on the ground and not suspended. Have an assistant move the steering wheel back and forth repeatedly to load steering components. Visually observe the following external steering and related suspension/frame components for looseness while the assistant works the steering (also see specific procedures under each component).
 - a. Column shaft, hardware, and steering linkage boots
 - b. Column U-joints or flexible coupling (as equipped)
 - c. Coupling at steering gearbox
 - d. Steering gearbox
 - e. Pitman Arm
 - f. Drag link
 - g. Steering knuckle or arms
 - h. Tie rod ends
 - i. Idler arm (as equipped)

Check the vehicle frame cross members and frame cross members and frame braces (including associate rivets and fasteners for looseness and condition).

2. Have the assistant carefully operate steering to full left and right turn, check for power assist pop off, and steering stops.
3. As a follow-up to the above steering check, also perform a visual and hands-on check of each of the listed components. See the following chart for details of component inspection.

Inspection Procedures	Repair (or note) If:	Out of Service if:
Steering Gear Box Mounting		
Check mounting, condition, and tightness of steering gear box, and check frame, frame braces, and associated rivets or fasteners for looseness and condition.		<u>Steering gear box loose or any mounting bolts loose or missing.</u> <u>There is any binding in steering gear box.</u>
Pitman Arm		
Check the pitman arm for looseness or misalignment at sector shaft splines and looseness at all joints. Check looseness of pinch bolt and fasteners and condition of pitman arm.	Pitman arm grease fitting (if originally equipped) is loose or missing (repair).	<u>Any play is observed between pitman arm and sector shaft.</u> <u>Pinch bolt at sector shaft is loose or missing.</u> <u>Pitman arm to sector shaft timing marks are misaligned.</u>

Inspection Procedures	Repair (or note) If:	Out of Service if:
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Drag Link		
Check the drag link ends, shaft, and fasteners for looseness and condition (on vehicles with I-beam suspension).	Any drag link end grease fitting (as equipped) is loose, or missing, or will not take grease. Drag link end boot is damaged or missing. Drag link needs lubrication. Drag link end if less than 1/8 inch Drag link dust boot (as originally equipped) is cut, damaged, or missing.	Drag link ball stud is loose in pitman arm or upper steering arm. Any nut is loose or missing, or cotter pin is missing. Drag link shaft is damaged or bent. Drag link end (non-adjustable type) has 1/8 inch or more axial (not rotational) play. Horizontal socket type (adjustable) drag link end has 1/8 inch or more axial or lateral play.
Steering Arm		
1) Check upper steering arm (Ackerman arm) and left and right side lower steering arms for securement and condition 2) Check condition and securement of steering stops and lock nuts.		Any steering arm has been bent, is cracked, or is damaged. Any steering arm attachment point is loose, or any fasteners, or cotter pin is missing. Either steering stop or lock is loose, damaged, or missing.
Tie Rod and Ends		
Check the tie rod ends, tie rod, dust boots, and clamps or fasteners (as equipped) for looseness, damage, and condition.	Tie rod end dust boot is cut, damaged, or missing. Tie rod end needs lubrication. Any tie rod end grease fitting is loose, missing, or will not take grease.	Tie rod clamps, fasteners, or cotter pin is stripped, missing, or loose. Any clamp (as equipped) is out of position. Any tie rod end is cracked or damaged. Any tie rod end has more than 1/8 inch or more axial play. Tie rod end ball stud is loose in steering arm or idler arm.
Idler Arm		
Check idler arm assembly (as equipped) for looseness, damage, and condition.	Idler arm needs lubrication. Idler arm grease fitting is loose, missing or will not take grease.	Any idler arm fasteners are loose or missing. Idler arm is cracked, damaged, or cotter pin is missing. Idler arm up and down play is greater than 1/4 inch total (1/8 inch either direction).

Outside Bus Battery Check

1. Hold down – Check for tightness, condition, and type of battery hold down. .

The vehicle shall be removed from service until repairs are made if:

- **Battery hold down assembly is corroded, or damaged causing insecure mounting of battery.**

2. Battery Terminals – Check terminals for cleanliness, tightness, and condition. Make repairs as soon as possible if:
 - Terminals are loose, damaged, corroded, or have missing hardware.
3. Battery Cables – Check cable assemblies for routing, securement, condition, and size. Make repairs if the following conditions exist:
 - Cable is corroded, misrouted or unsecured.

The vehicle shall be removed from service until repairs are made if:

- **Cable, wiring, connector or insulation is cracked enough to expose internal wiring.**
- **Wire/conductor is exposed to or routed against a sharp edge.**
- **Wire/conductor is exposed to or routed against exhaust or extremely hot surface.**
- **Cable is smaller than original equipment size.**
- **Pass through grommet is missing.**

4. Cleanliness – Check cleanliness of batteries. Make repairs if:
 - Battery top or sides are corroded, greasy, dirty, or wet with electrolyte.

The vehicle shall be removed from service until repairs are made if:

- **The battery is cracked or damaged it shall be replaced before operating.**

5. Tray – Check battery tray for operation, condition, and securement. Make repairs if the following conditions exist:

- Battery slide tray is corroded, dirty, or hard to slide in and out

The vehicle shall be removed from service until repairs are made if:

- **Battery tray is not locked in place.**
- **Battery box door does not open or will not stay latched as designed.**
- **Battery slide tray or box is damaged or deteriorated reducing security of batteries.**

Engine Compartment

Fluid Levels

1. Brake Fluid – Check fluid level and condition. If fluid is low, an inspection shall be made. Make repairs if any of the following conditions exist:
 - Level of brake fluid in either side of master cylinder reservoir is lower than ¼ inch from top or below “Add” mark (if equipped).
 - Brake fluid shows evidence of excessive water, oil, or dirt contamination.

The vehicle shall be removed from service until repairs are made if:

- **Any evidence of a fresh leak is detected.**
- **Fluid is excessively low (less than ¼ full).**

2. Power Steering Fluid /Hydraulic Brake Assist Fluid – Check the power steering reservoir fluid levels and condition. Make repairs if:

- power steering fluid is below cold “Add” mark.
- if power steering fluid shows evidence of excessive water, oil, or dirt contamination.

The vehicle shall be removed from service until repairs are made if:

- **Fluid is excessively low (less than $\frac{1}{4}$ full).**

3. Oil – Check the level and condition of oil. Repair if:
 - Engine oil is below “Add” mark.

The vehicle shall be removed from service until repairs are made if:

- **No oil is observed on dipstick.**
- **There is evidence of fuel or water contamination in the oil.**
- **If the dipstick is missing.**

4. Transmission Fluid – Check the level and condition of transmission fluid. Make repairs if any of the following conditions exist:
 - Transmission fluid is below “Add” mark.
 - Transmission fluid shows evidence of excessive water or dirt contamination.
 - Transmission fluid shows need of servicing (discoloration and/or burnt smell).

The vehicle shall be removed from service until repairs are made if:

- **The transmission fluid is not present on dipstick, or is above the full mark (overfilled),**
- **The dipstick is missing.**

5. Windshield Washer Fluid – Check windshield washer fluid level. Make repairs if:
 - Reservoir is low or the windshield washer does not spray windshield.
6. Coolant – Check coolant (antifreeze) level and condition. Make repairs if any of the following conditions exist:
 - Coolant level in radiator or reservoir is low.
 - Coolant shows evidence of excessive oil, dirt, contamination, rust and corrosion.

The vehicle shall be taken out of service until repairs are made if:

- **Coolant cannot be seen in reservoir or in radiator tank with cap removed.**

Fluid Leaks

1. Oil – Inspect for engine oil leaks at all potential locations and determine severity. Make repairs if any of the following conditions exist:
 - Engine oil leakage is causing deterioration of any rubber parts such as steering linkage boots, hoses, etc.
 - Engine oil is dripping at any location (except on exhaust system).

The vehicle shall be removed from service until repairs are made if:

- **Fresh engine oil is found on any portion of exhaust system.**

2. Coolant – Inspect all potential locations for coolant leaks. Make repairs if any of the following conditions exist:
 - There is coolant seepage at radiator, hoses, heater core, engine oil cooler, thermostat housing, head gaskets, freeze plugs, reservoir, water pump or other potential locations.

The vehicle shall be removed from service until repairs are made if:

- **Coolant leakage is excessive and could result in engine failure.**

3. Transmission – Inspect for transmission fluid leaks at all potential locations and determine severity. Make repairs if any of the following conditions exist:
 - Transmission fluid is causing deterioration of any rubber parts, such as steering linkage boots, hoses, etc.
 - Transmission fluid is seeping at any location (except on exhaust system).

The vehicle shall be removed from service until repairs are made if:

- **Fresh transmission fluid is found on any portion of the exhaust system.**

4. Power Steering – Inspect the power steering for power steering fluid leaks at all potential locations and determine the severity. Make repairs if any of the following conditions exist:
 - Power steering fluid is causing deterioration of any rubber parts, such as steering linkage boots, hoses, etc.
 - Power steering fluid is seeping.

The vehicle shall be removed from service until repairs are made if:

- **Power steering fluid is dripping.**

Belts

1. Tightness – Visually and physically check all drive belts for proper tension. If available, use a tension gauge. If a gauge is not available, use a ruler to measure the deflection of the belt (s) up and down at the widest point between the drive and driven pulley(s). Make repairs if any of the following conditions exist:
 - Any belt exceeds tension reading recommended by manufacturer if a tension gauge is used.
 - If ruler method is used, make repairs if any belt is less than ½ inch deflection (too tight) when firm pressure is applied.

The vehicle shall be removed from service until repairs are made if:

- **Any belt tensioner that does not pivot or move freely and apply spring pressure on belt.**
- **Any tension on belts that is too loose (based on specifications of type tension gauge used).**
- **Tension of any belt (using ruler method) that is too loose when firm pressure is applied (greater than ¾ inch deflection).**
- **Any slippage is detected.**

2. Condition – Visually inspect belt(s) for glazing, oil contamination, dry rotting, cuts, and separation of plies. Check belts for twisting and distortion. Make repairs if any of the following conditions exist:
 - Belt is glazed.
 - Belt is oil saturated, dry-rotted, cut, or plies of belt(s) are separated.
 - Belt is distorted or twisted.
3. Routing – Visually inspect belt for rubbing or contact with objects other than pulleys and for routing around correct pulleys. Make repairs if any of the following conditions exist:
 - Belt is making contact with objects other than pulley or belt is routed around incorrect pulley.
4. Belt Alignment – Visually inspect belts for proper alignment. Make repairs if any of the following conditions exist:
 - Any belt is not inline or if any belt is misaligned that could result in failure.

Hoses

NOTE: References to hoses includes all types of hoses located in the engine compartment, including power steering, coolant, air compressor intake, vacuum, brake hydraulic assist, engine oil, and transmission hoses.

1. Clamps and Connections – Visually and physically check that hose connections or clamp(s) are tight. Make repairs if any of the following conditions exist:
 - Hose connection or clamp(s) is loose or too tight digging into hose.
 - Hose connection or clamp(s) is stripped/damaged.
2. Condition – Visually inspect all hoses for cuts, abrasions, wear, oil saturation, dry rotting, or “ballooning.” Make repairs if any of the following conditions exist:
 - Any hose is cut, abraded, worn, oil saturated, dry-rotted, or “ballooned” to the point that failure could occur.
3. Routing – Visually inspect routing and securement of all hoses. Make repairs if any of the following conditions exist:
 - Any hose is misrouted or unsecured so heat damage, abrasion, or cuts could result in failure.

Air Filter Assembly

Check air cleaner assembly (housing, lid, piping, gasket, seal, and clamp(s) for securement, condition and check filter minder). Check for presence of wing nut and seal (if equipped). Make repairs if any of the following conditions exist:

- Any portion of the air cleaner assembly or mounting is loose or damaged, including piping, nuts, bolts or clamps; worn or damaged seals/gaskets.
- Any air or vacuum leaks or missing components.
- Evacuator valve is worn or missing.

The vehicle shall be removed from service until repairs are made if:

- **The diesel air filter restriction exceeds manufacturer’s specifications.**
- **The air filter minder is missing or broken.**

Power Steering Pump

Check securement and condition of power steering pump.

The vehicle shall be removed from service until repairs are made if:

- **Any portion of the power steering pump, mounting brackets or fasteners is cracked, loose or missing.**

Air Compressor and Filter

Check securement and condition of air compressor and filter assembly. Make repairs if any of the following conditions exist:

- Air compressor air filter (if equipped) is dirty or cover is missing.
- Hose from engine air cleaner to air compressor is damaged, torn, or missing.

The vehicle shall be removed from service until repairs are made if:

- **Compressor mounting brackets or fasteners is cracked, loose or missing.**

Water Pump

Check condition of water pump and pulley. Make repairs if any of the following condition(s) exist:

- Evidence of a coolant leak from the water pump, seal, gasket surface, or weep hole
- Water pump fasteners are loose, damaged, or missing.

The vehicle shall be removed from service until repairs are made if:

- **Water pump is noisy.**
- **Bearing is damaged.**
- **Coolant is leaking out.**

Fan

Check fan blade and fan clutch assembly for securement and condition.

The vehicle shall be removed from service until repairs are made if:

- **Fan has any cracked, bent, or broken blades.**
- **Any portion of fan mounting is loose.**
- **Fan clutch is seized or loose.**

Alternator

Check securement and condition of alternator assembly. Make repairs if:

- Alternator is noisy.

The vehicle shall be placed out of service until repairs can be made if:

- **Any portion of the alternator, mounting brackets or fastener is cracked/loose/missing.**
1. Routing and Condition Check routing, securement, and condition of all wiring and any electrical cable in the engine compartment. Make repairs if any of the following conditions exist:
 - Any loose, damaged, or corroded wiring connector or terminal end.
 - Any repair has been made using improper gauge wiring.

The vehicle shall be taken out of service until repairs can be made if:

- **There is any unsecured or poorly routed wiring that could cause a potential short or fire due to abrasion or heat damage.**
- **Burnt wiring or wiring missing insulation (other than ground wires) is present.**

Air Conditioning

Check mounting of A/C compressor. Observe routing, securement, and condition of all refrigerant lines and any electrical connections. Make repairs if any of the following conditions exist:

- Any loose or damaged lines.
- A/C dryer sight glass indicates "wet".
- Loose or worn belts and idlers.

Fuel System and Lines

Visually check the condition, operation, and securement of all fuel system components including fuel lines and routing in the engine compartment. Make repairs if any of the following conditions exist:

- Evidence of dirt, algae, or water in the fuel water separator (if equipped).

The vehicle shall be removed from service until repairs can be made if:

- **Any fuel system connection is stripped, loose, cracked, or leaking.**

- **Any fuel line or hose is unsecured or poorly routed such that it could cause potential fire.**

Radiator

1. Radiator Mounting – Check radiator assembly and mounting for securement and condition. Make repairs if any of the following conditions exist:
 - Any portion of the radiator or mounting system is cracked, damaged, loose or missing fasteners.
2. Cap – Check condition of radiator cap. Warning – always use proper procedures when removing radiator cap. Make repairs if any of the following conditions exist:
 - The radiator cap is hard to open or close.
 - The radiator cap is the wrong pressure rating.
 - Visible damage to the pressure seat or vacuum relief seat of the cap.

The vehicle shall be taken out of service until repairs can be made if:

- **The radiator cap is missing.**
3. Reservoir – Check coolant reservoir (including any overflow tank) and sight glass (if equipped) for mounting and condition. Make repairs if any of the following conditions exist:
 - Any portion of the coolant reservoir or mounting system is cracked, damaged, leaking, loose or missing fasteners.
 4. Fan Shroud – Check fan shroud for mounting and condition. Make repairs if any of the following conditions exist:
 - Any portion of the fan shroud or shroud mounting is cracked, damaged, loose or missing fasteners.

The vehicle shall be taken out of service until repairs can be made if:

- **Fan shroud is missing.**
- **Fan shroud is loosely mounted and could cause damage to fan blades or drive belt(s).**

Underneath Bus

Front Suspension Checks

1. Wheel Bearings – Inspect front wheel bearings and related components for condition and proper adjustment of bearings.

NOTE – It is important to correctly identify the source of any play. To determine if the play is in the wheel bearings, have an assistant fully apply the brakes while rechecking play. If movement disappears with brakes applied, then play was in the wheel bearings.

Make repairs if any of the following conditions exist:

- Minor seepage of grease or oil around the dust cover.
- Dust cover or fasteners is loose or missing.

The vehicle shall be taken out of service until repairs can be made if:

- **There is any noise, binding, or roughness discovered in bearings.**
- **Wheel bearing endplay exceeds manufacturer's specifications (maximum of .010" in and out play measured at bearing hub).**

2. I-Beam – Inspect I-beam axle assembly.
The vehicle shall be taken out of service until repairs can be made if:
- **I-beam has been cut, modified or damaged (other than qualified machine shop to repair axle eye).**
 - **There is any bluing or other evidence that the I-beam has been heated.**

3. King Pins – Inspect king pin assemblies. Make repairs if any of the following conditions are found:

- End cap O-rings or bolts are loose or missing.

The vehicle shall be taken out of service until repairs can be made if:

- **Locking pin is backing out, loose, or missing.**
- **Kingpin movement is more than ¼ inch measured at the outside edge of the tire.**
- **Vertical (up and down) play in kingpin assembly is greater than .030”.**
- **Thrust bearing is damaged or missing.**

NOTE – If play is beyond specifications, wear may be kingpin, axle eye, and/or king pin bushings. Do not tighten kingpin lock (if equipped) or grease kingpin before inspecting kingpin assembly.

4. Spring Hanger, Shackles and Attachments– Inspect condition of spring hangers and pinch bolts. Make repairs if any of the following conditions exist:
- Front spring hanger has significant side wear at the spring eye.
 - Front spring hanger is worn.

The vehicle shall be taken out of service until repairs can be made if:

- **Any front spring shackle or hanger is loose, cracked, broken.**
- **Front spring mount-to-frame fastener is loose, missing, broken, cracked.**
- **Frame is cracked at any spring mounting location.**
- **Pinch bolt is stripped or missing so that spring pin cannot be clamped tightly.**

5. Pins and Bushings – Inspect pins and bushings as follows: Inspect front spring pins and bushings for wear, lubrication and securement.

The vehicle shall be removed from service until repairs can be made if:

- **Wear exceeds ¼ inch.**
- **Bushing is missing.**

6. A-Frames and Bushings – Inspect A-frames and bushings for condition and securement. Make repairs if any of the following conditions exist:

- Rubber-bushing is split, badly deteriorated.
- Rubber bushing is badly extruded from suspension joints.

The vehicle shall be taken out of service until repairs are made if:

- **A-frame assembly is bent, missing or broken.**
- **Fasteners/u-bolts are loose or missing.**
- **Mounting of bushing assembly is not secure.**
- **Rubber bushing is missing.**
- **A-frame, bushing or pivot arm has more than .050 free play at pivot point.**

7. Ball Joints – Inspect ball joints for condition, securement, and lubrication. Make repairs if any of the following conditions exist:
- Zerk (grease) fitting is missing, damaged or ball joint will not take lubrication.
 - Any ball joint has more than 3/32-inch axial play.

The vehicle shall be removed from service until repairs are made if:

- **Ball joint mounting is loose or missing.**
- **Cotter pin is missing.**
- **Ball joint to A-frame mounting is cracked, loose or has been welded.**

8. U-Bolts – Inspect spring U-bolts for condition and securement. Make repairs if any of the following conditions exist:
- U-bolt is misaligned.
 - Rust underneath any U-bolt nuts indicates the possibility of looseness.

The vehicle shall be taken out of service until repairs are made if:

- **Any shock mount bracket, U-bolt, seating plate or nut is loose, missing, cracked or stripped.**

9. Shocks – Inspect shocks for condition and securement. Make repairs if any of the following conditions exist:
- There is wetness around shock body due to leaking shock fluid.
 - Any shock mounting or fastener is loose.

The bus shall be removed from service until repairs can be made if:

- **Any shock is broken or missing.**

10. Springs – Inspect front springs for condition, securement, and alignment. Make repairs if any of the following conditions exist:
- Loose, missing, broken or worn spring clips.
 - Coil or leaf spring has flattened, and ride height is less than manufacturer's specifications.
 - Rubber bumper is missing.

The vehicle shall be removed from service until repairs are made if:

- **Either front spring saddle is missing (if equipped).**
- **Any leaf spring is broken, cracked or missing.**
- **Spring eye is worn or spread such that bushings are loose in spring eye.**
- **Coil spring is broken or insecurely mounted.**
- **Non-OEM blocks or spacers are installed.**
- **There is misalignment of spring leaves or other evidence that center pin is loose or broken.**
- **Either front coil or leaf spring is worn so that the rubber frame bumper is damaged or worn due to frequent bottoming of front suspension.**
- **Alignment wedge is loose or damaged.**
- **Air bag type spring assembly is damaged/leaking.**

11. Wheel Seals – Check for condition and leakage. Make repairs if any of the following conditions exist:
- Either front wheel seal is damaged or leaking.

The vehicle shall be removed from service until repairs are made if:

- **Evidence of fresh oil is found on the brake linings, drums or rotors.**

Brakes

1. Brake Hoses – Inspect brake flexible hoses for condition, securement, and routing. Make repairs if any of the following conditions exist:
 - Any brake flex hose supporting brackets are damaged or have loose fasteners.
 - Any brake flex hose is rubbing or routed against other components.

The vehicle shall be taken out of service until repairs can be made if:

- **Any brake hose or connection is leaking fluid or air pressure.**
- **Any brake hose is kinked, collapsed or bulging.**
- **Any brake hose has damaged plies, cords or is damaged below outer covering.**

2. Lines – Inspect air and hydraulic brake lines for routing, securement and condition. Make repairs if any of the following conditions exist:
 - Brake line bracket or securement system is loose or missing.
 - Brake line is rubbing on other components or abraded.
 - Brake line is not of OEM material, size or type.

The vehicle shall be taken out of service until repairs are made if:

- **Brake line is crimped or damaged significantly and restricting air pressure or hydraulic fluid.**
- **Brake line or connection is leaking air pressure or hydraulic fluid.**

3. Chambers – Inspect brake chamber assembly for securement, condition, and proper size. Make repairs if any of the following conditions exist:
 - Brake chamber or mounting fastener is damaged/loose.

The vehicle shall be taken out of service until repairs can be made if:

- **Brake chamber-mounting bracket is cracked, bent or broken.**
- **Either chamber is not of the original size.**
- **Size of chambers is not matched left and right (both sides must be the same size).**
- **Non-manufactured holes are found in the spring brake housing.**

4. Slacks – **IF AUTOMATIC SLACK IS OUT OF ADJUSTMENT—DO NOT ADJUST, MUST BE REPAIRED OR REPLACED** Inspect slack adjusters and S-cam assemblies for wear, condition, operation, and securement. Make repairs if any of the following conditions exist:
 - Slack adjuster mounted so that adjuster bolt is facing chamber.
 - S-cam shaft and S-cam bushing total wear (up and down) is greater than .040”.
 - S-cam in and out endplay is more than .060”.
 - Slack adjuster is dirty and prevents the lock sleeve from seating and the technician from inspecting for cracks.

The vehicle shall be taken out of service until repairs are made if:

- **Any portion of the slack adjuster or S-cam is missing, broken, cracked, or badly worn.**
- **S-cam snap ring is missing.**
- **Slack adjuster has a frozen or stripped worm gear or ratchet assembly.**

5. Pushrods – Inspect pushrod assembly for condition, securement, and alignment. Make repairs if the following conditions exist:
- Any portion of pushrod is rubbing against body of chamber or chamber is misaligned.
 - Pushrod on the left and right side are not mounted in identical (same) slack adjuster location hole (same effective slack adjuster length).

The vehicle shall be taken out of service until repairs are made if

- **Any portion of the pushrod assembly (locknut, pushrod, clevis and pin, or cotter pin) is loose, missing or damaged.**
- **Non-OEM clevis installed (welded vs non-welded).**

6. Linings – Inspect brake lining through inspection cover or hole.

The vehicle shall be taken out of service until repairs are made if:

- **Lining is broken, cracked, or loose on shoe.**
- **Shoe platform or webbing is cracked/damaged.**
- **There is any loose, damaged, or missing foundation brake hardware within the drum.**
- **Friction surface is contaminated with oil, grease, or brake fluid.**
- **Lining with a thickness less than 3/16 inch on a continuous lining or 1/4” for a shoe with two pads. (IF EQUIPPED WITH DISC STYLE BRAKES, MINIMUM IS 1/8”).**

7. Drums – Inspect brake drums for condition.

The vehicle shall be removed from service until repairs can be made if:

- **There is any grease, oil or brake fluid on the inside of the drum.**
- **Any drum is not mounted securely to hub.**
- **Fasteners are loose.**
- **Drums have external crack or cracks that open upon brake application.**

8. Rotors – Inspect brake rotors for mounting and condition.

The vehicle shall be removed from service until repairs can be made if:

- **Rotor mounting is not secure.**
- **Friction surface is contaminated with oil, grease, or brake fluid.**
- **Any rotor friction surface is significantly grooved or damaged.**

9. Wheel Cylinders or Calipers – Inspect wheel cylinders or calipers for leaks, mounting and condition.

Make repairs if any of the following conditions exist:

- Brake lining/pad indicates tapered wear.

Vehicle shall be removed from service until repairs can be made if:

- **Any wheel cylinder or caliper is not securely mounted.**
- **Loose or missing fasteners are present.**
- **Rotor/ drum damage is observed.**
- **Wheel cylinder /caliper is sticking.**

Brake Stroke Measurement & Brake Adjustment

The proper way to determine if the brakes require adjustment is to measure the at-rest and applied distance of the brake push rods as follows;

10. Brake Adjustment

- a. For hydraulic drum brakes, Check brake adjustment at every inspection.
- b. For S-cam or air disc brakes at every monthly inspection, brake chamber pushrod travel must be checked at all four wheel positions. PUSHROD TRAVEL MUST BE MEASURED AND RECORDED ON THE TD-30.

Brake Adjustment Procedure: **(Slack replacement or brake repair only)**

- Chock Tires
- Release all Brakes
- Verify Air Pressure is between 90-100 PSI.
- Mark All Push Rods with Chalk
- Fully Apply Brake
- Measure the Distance the Push Rod Travels at Each Chamber
- Record Push Rod Travel
- Compare Measurement to the Brake Chamber chart in this manual.

Commercial Vehicle Safety Alliance
North American Uniform Out-Of-Service Criteria Reference Charts
CLAMP TYPE BRAKE CHAMBER DATA

TYPE	OUTSIDE DIAMETER	BRAKE ADJUSTMENT LIMIT
6	4-1/2" (114mm)	1-1/4" (32mm)
9	5-1/4" (133mm)	1-3/8" (35mm)
12	5-11/16" (145mm)	1-3/8" (35mm)
16	6-3/8" (162mm)	1-3/4" (45mm)
20	6-25/32" (172mm)	1-3/4" (45mm)
24	7-7/32" (184mm)	1-3/4" (45mm)
30	8-3/32" (206mm)	2" (51mm)
36	9" (229mm)	2-1/4" (57mm)

NOTE: A brake at the adjustment limit is not a violation.

"LONG STROKE" CLAMP TYPE BRAKE CHAMBER DATA

TYPE	OUTSIDE DIAMETER	BRAKE ADJUSTMENT LIMIT
12	5-11/16" (14.5cm)	1-3/4" (4.5cm)
16	6-3/8" (162mm)	2.0" (51mm)
20	6-25/32" (172mm)	2.0" (51mm)
24	7-7/32" (184mm)	2.0" (51mm)
24*	7-7/32" (184mm)	2.5" (64mm)
30	8-3/32" (206mm)	2.5" (64mm)

* For 3" maximum stroke type 24 chambers

NOTE: A brake at the adjustment limit is not a violation.

- c. If adjustment is needed, wheels must be raised off of the ground. Only for vehicles with non-automatic slack adjusters; or if automatic slack adjusters have been replaced/ repaired)

The vehicle shall be removed from service until repairs are made if:

- **There is any damage or condition that prevents proper adjustment of S-cam or air disc type brakes.**

- d. Automatic slack adjusters- **DO NOT ADJUST BRAKES ON VEHICLES WITH AUTOMATIC SLACK ADJUSTERS. SLACK ADJUSTERS MUST BE REPLACED OR REPAIRED IF BRAKE ADJUSTMENT LIMIT EXCEEDS MAXIMUM ADJUSTMENT LIMITS, (Refer to chamber data above). IF LIMIT IS EXCEEDED, SELF-ADJUSTING MECHANISM NEEDS TO BE REPAIRED OR REPLACED.**
Follow slack adjuster manufacturer's adjustment procedure when replacing slacks.

***Important note-"Manually adjusting automatic slack adjusters is dangerous. It should not be done, except during installation or in an emergency to move the vehicle to a repair facility....Adjusting automatic slack adjusters often mask the real problem which is the automatic slack adjusters are no longer functioning as designed. By adjusting defective automatic slack adjusters the operator is given a false sense of security about the effectiveness of braking ability, which will likely go out of adjustment shortly after operational service is resumed. Also repeatedly adjusting defective automatic slacks causes abnormal wear to the internal adjusting mechanism which ultimately leads to failure of this component". (Reference "Lessons Learned from a Fatal Crash", National Transportation Safety Board. See Appendix B)

- e. AUTOMATIC SLACKS MUST BE CHECKED EVERY 30 DAYS; PUSHROD TRAVEL MUST BE MEASURED AND RECORDED ON THE TD-30.

The vehicle shall be removed from service until repairs are made if:

- **Any automatic slack adjuster arm or mechanism is damaged or loose.**

Brake Equipment

Bleed Reservoirs – With air system fully charged, check manual operation of safety relief valve. Partially open manual petcock valve on the first (wet) tank. Allow tank to drain until all moisture and contamination are drained. Make repairs if any of the following conditions exist:

- There is moisture in reservoir (desiccant type air dryer equipped vehicles only).
- If excessive oil is found in air system.

The vehicle shall be taken out of service until repairs are made if:

- **Safety valve leaks or does not release pressure.**
- **Excessive sludge or oil contamination in the reservoir (more than (8) fluid ounces).**
- **Reservoir is cracked or leaks due to corrosion.**

Manual Tank Drain/Electronic Drain Valve System – With air system fully charged, check manual operation of safety relief valve. Partially open manual petcock valve on the first (wet) tank. Allow tank to drain until all moisture and contamination are drained. Make repairs if any of the following conditions exist:

- There is moisture in reservoir (desiccant type air dryer equipped vehicles only).
- Excessive oil is found in air system. (If equipped with Electronic brake drain system, make repairs if drain system is not functioning as designed).

The vehicle shall be taken out of service until repairs are made if:

- **Safety valve leaks or does not release pressure.**
- **Excessive sludge or oil contamination in the reservoir (more than eight (8) fluid ounces).**

- **Reservoir is cracked or leaks due to corrosion.**

Engine / Transmission Mounts / Starter Mounting

1. Engine/Transmission Mounts – Inspect engine and transmission mounts for condition and securement. Repairs shall be made if the following conditions exist:
 - Mounting fasteners are loose, missing, or broken.
 - Any mount is cracked or has deteriorated rubber.
2. Starter Mounting – Inspect starter for securement and condition. Check for presence of heat shield (if equipped). Make repairs if any of the following conditions exist:
 - Loose heat shield.
 - Starter mounting bolts, studs or nuts are loose, damaged, missing, or broken.
 - Loose or damaged starter.
 - Missing heat shield (if equipped).

Transmission Checks

1. Transmission Bolts – Inspect transmission assembly and mounting fasteners for condition and securement. Make repairs if any of the following conditions exist:
 - Any transmission assembly fastener is loose, missing, or damaged.

The vehicle shall be taken out of service until repairs are made if:

- **Transmission is not mounted securely to flywheel housing.**
- **External indication that any torque converter bolt is loose or missing.**

2. Linkage – Inspect transmission linkage for routing, condition, and securement. Make repairs if any of the following conditions exist:
 - Modulator cable or vacuum hose routed where it is subject to excessive heat or abrasion.
 - Linkage hardware or fasteners are loose.
 - Exposed modulator cable or damaged casing.
 - Deteriorated or loose modulator vacuum hose.

The vehicle shall be taken out of service until repairs are made if:

- **Linkage is bent, damaged, binding or severely misadjusted.**
- **Linkage hardware or fasteners are missing.**
- **Linkage is damaged so as to cause it to stick or bind.**
- **Modulator vacuum hose is leaking or not connected.**

3. Lines – Inspect transmission lines for securement, routing, and condition. Make repairs if any of the following conditions exist:
 - Transmission line unsecured or routed subject to excessive heat or abrasion.
 - Transmission line crimped; transmission line of improper type.
 - Transmission line is worn or deteriorated to the point that failure could occur.
4. Auxiliary Filter – Inspect transmission external filter assembly (if equipped) for securement and condition. Make repairs if any of the following conditions exist:
 - External filter mounting is loose, missing fasteners or filter canister is damaged.

The vehicle shall be taken out of service until repairs are made if:

- **The body of the transmission filter housing, including all hose connections, are cracked or damaged.**

5. Cooler – Inspect transmission cooler (as equipped) for securement and condition. Make repairs if any of the following conditions exist:
 - The mounting of separate transmission cooler is loose or leaking.
 - Has loose/missing fasteners.
6. Clutch Operation (if equipped)
 - a. Check pedal, linkage, clutch and release bearing for wear, slippage, and abnormal noises in the engaged and released positions. Make repairs if the following conditions exist:
 - Loose bolts or nuts.
 - Noisy release bearing.
 - Clutch is out of adjustment.

The vehicle shall be taken out of service until repairs are made if:

- **The clutch cannot be adjusted to specifications.**
- **Release bearing is excessively noisy.**
- **Clutch is slipping, grabbing, or has excessive chatter when engaging clutch.**
- **Linkage or return spring is binding or sticking.**
- **Transmission is hard to shift.**

- b. Visually check clutch pedal pad for wear. Make repairs if:
 - The pedal cover pad is worn.

The vehicle shall be removed from service if:

- **The clutch pedal cover pad is missing.**
- **Built up with extender block not of OEM design.**

- c. Check clutch master and slave cylinders for hydraulic leaks and operation.

The vehicle shall be removed from service until repaired if:

- **Either master or slave cylinder is leaking or inoperable.**

7. Clutch Adjustment (if equipped)-Check free play travel of the clutch pedal. This is the first easy movement of the clutch pedal. It shall be no more than 1½ “and no less than ¾” of travel.

Fuel Tank

1. Leaks – Inspect fuel tank assembly for leaks.

The vehicle shall be taken out of service until repairs are made if any of the following conditions exist:

- **Fuel leakage from the tank.**
- **Fuel cap is missing.**
- **Fuel tank has any cracks.**
- **Connections are loose at the tank.**

2. Mounting – Inspect fuel tank mounting system and barrier for securement and condition.

The vehicle shall be taken out of service until repairs are made if:

- **Any portion of fuel tank mounting system is missing, loose, cracked, or broken (including support brackets, retaining straps, and chassis frame).**
- **Fuel tank mounting fasteners are loose or missing.**

- **Crash barrier assembly is damaged, insecurely mounted or missing.**
3. Hoses – Inspect all fuel lines and under-bus fuel system components for routing, securement and condition.

The vehicle shall be taken out of service until repairs are made if:

- **Fuel line or hose is unsecured or is routed subject to excessive heat or abrasion.**
 - **Fuel line or hose is deteriorated or damaged.**
 - **Clamps are loose or missing (including cracks or damage that may cause potential leakage).**
 - **Under-bus fuel system filter, water separator, or other components are insecurely mounted, cracked or damaged.**
4. Wiring – Inspect fuel tank sending unit wiring for securement, routing, and condition. Make repairs if any of the following conditions exist:
 - Any wiring or connection has been damaged.

The vehicle shall be taken out of service until repairs are made if:

- **Any portion of sending unit wiring (including ground) or connections is unsecured or missing insulation.**
- **Wiring is routed subject to excessive heat or abrasion.**

Driveline

1. Drive shaft – Inspect drive shaft for condition. Make repairs if any of the following conditions exist:
 - Drive shaft balancing weight (if originally equipped) is missing.
 - Drive shaft has foreign material wrapped around it.

The vehicle shall be taken out of service until repairs are made if:

- **Drive shaft is bent or seriously dented.**
 - **Cracks or other damage in the drive shaft, which could cause structural failure.**
2. U-Joints – Inspect U-joints or constant velocity joints (if equipped) for condition, phasing (alignment of joints), lubrication, and presence of all hardware. Make repairs if any of the following conditions exist
 - U-joints or constant velocity joints are dry of lubrication.
 - Zerk (grease) fitting (if equipped) is missing, clogged or inaccessible.

The vehicle shall be taken out of service until repairs can be made if:

- **Hardware or fasteners are missing in any U-joint or CV joint assembly.**
 - **U-joint has significant cross-shaft-to-bearing cup play or CV joint has significant play.**
 - **U-joint or CV joint shows evidence of significant rusting of bearings.**
 - **Bearing cup in yoke is loose.**
3. Yokes – Inspect drive shaft yokes for condition and lubrication. Make repairs if any of the following conditions exist:
 - Drive shaft splines are unlubricated.
 - Dust cap on yoke is missing.
 - Zerk (grease) fitting is missing or clogged.
 - Cork washer in dust cap is missing.

The vehicle shall be taken out of service until repairs are made if:

- **Any yoke has significant play in splines.**

- **Any yoke is cracked or damaged.**
4. Hanger Bearings – Inspect hanger bearings and rubber insulators for condition and securement. Make repairs if any of the following conditions exist:
- Hanger bearing rubber insulator is deteriorated, damaged, oil soaked.
 - Hanger- bearing support is misaligned.

The vehicle shall be taken out of service until repairs are made if:

- **Bearing outer race is loose in insulator.**
 - **Inner race is loose on shaft.**
 - **Significant play in hanger bearing.**
 - **Missing or damaged hardware/fasteners in hanger bearing or support assembly.**
5. Guards – Inspect for presence and condition of drive shaft guards. Make repairs if any of the following conditions exist:
- Any drive shaft guard is bent, damaged or loose.
 - Drive shaft guard has damaged mounting fasteners.

The vehicle shall be taken out of service until repairs are made if:

- **Drive Shaft guard is missing.**
6. Drive Shaft Park Brake – Inspect drive shaft park brake assembly for adjustment and condition. Check mounting, securement, linkage, drum and all other related hardware. Make repairs if any of the following conditions exist:
- Lining is worn down to 2/32 inch from top of rivet head.
 - Lining is contaminated with grease/oil.

The vehicle shall be taken out of service until repairs are made if:

- **Lining is broken, cracked or loose.**
- **Drum is cracked or has excessive heat damage or scoring of friction surface.**
- **Actuating/mounting hardware or fastener is damaged, loose/missing.**
- **Park brake is not adjusted per manufacturer’s specifications.**

Rear Suspension

1. Axle Housing – Inspect axle housing for condition and leakage. Make repairs if any of the following conditions exist:
- There is leakage at or around axle housing ends.

The vehicle shall be taken out of service until repairs are made if:

- **Any portion of axle housing is cracked or bent.**
 - **Any portion of axle housing is leaking lubricant due to cracks, porous metal, or defective weld.**
2. Vent – Inspect condition of axle housing vent. Make repairs if any of the following conditions exist:
- Vent cap is clogged.
 - Vent hose (if originally equipped) is cracked, clogged, or missing.

3. Differential – Inspect differential assembly for condition, lubricant level, and leakage. Make repairs if any of the following conditions exist:
 - Lubricant level is low.
 - Differential gaskets or seals are leaking.
 - Any external differential hardware or fasteners are loose or missing.

The vehicle shall be taken out of service until repairs are made if:

- **Lubricant is excessively low in the differential.**
- **Differential pinion yoke has endplay or side play exceeding manufacturer's specifications.**
- **Pinion/yoke end nut is loose or missing.**

4. Springs – Inspect rear springs for condition, securement, and alignment. Make repairs if any of the following conditions exist:
 - Any loose, missing, broken, or worn spring clips.
 - Any leaf spring or air suspension ride height is less than manufacturer's specifications.
 - Rubber frame bumper is missing.

The vehicle shall be taken out of service until repairs are made if:

- **Any leaf spring is broken or missing.**
- **Air bag type spring assembly is damaged/leaking.**
- **Air lines or valves are damaged/leaking.**
- **Misalignment of spring leaves or other evidence that centering pin is loose or broken.**
- **Either rear leaf spring is worn to the point that suspension bottoming has damaged rubber frame bumper.**

5. U-Bolts – Inspect spring U-bolts for condition and securement. Make repairs if any of the following conditions exist:
 - Any U-bolt is misaligned.
 - If there is rust underneath U-bolt nuts indicating possibility of looseness.

The vehicle shall be taken out of service until repairs are made if:

- **Any U-bolt seating plate or shock mount bracket nut is loose missing cracked, or stripped.**

6. Shocks – Inspect shocks for condition and securement. Make repairs if any of the following conditions exist:
 - Wetness around shock body due to leaking shock fluid.
 - Shock mounting or fastener is loose.

The bus shall be removed from service until repairs are made if

- **Any shock is broken or missing.**

7. Pins and Bushings – Inspect condition of pins and bushings. Inspect front spring pins and bushings for wear, lubrication and securement.

The vehicle shall be removed from service until repairs are made if:

- **Wear exceeds ¼ inch.**
- **Bushing is missing.**

8. Spring Hanger/Shackles/Attachments– Inspect condition of spring hangers and pinch bolts. Make repairs if any of the following conditions exist:
 - Spring hanger has significant side wear at the spring eye.
 - Any hanger is found with a small crack (1/2 inch or less) that are welded (steel only).

The vehicle shall be taken out of service until repairs are made if:

- **Spring shackle/hanger is loose, cracked or broken.**
- **Spring mount-to-frame fastener is loose, missing, broken or cracked.**
- **The frame is cracked at any spring mounting location.**
- **Spring hanger or bracket is cracked or broken (1/2 inch or more).**
- **Any mounting fastener is loose or missing.**
- **Spring hanger is worn, pinch bolt is stripped or missing so that spring pin cannot be clamped tightly.**

9. Seals – Inspect rear wheel seals for condition and leakage. Make repairs if any of the following conditions exist:
 - There is wetness or dripping of grease around axle flange.
 - Axle flange stud or nut is loose or missing.

The vehicle shall be taken out of service until repairs are made if:

- **Evidence of fresh oil is found on the brake linings or drums/rotors.**

10. Wheel Bearings – (Chock wheels) Inspect rear wheel bearings for condition and proper adjustment.

- Raise the rear wheels (wheels unloaded) and release park brake.
- Grasp tire and attempt to rock wheel assembly to check for movement.

The vehicle shall be taken out of service if:

- **There is any detectable looseness or roughness in rear wheel bearings.**

Body Securements and Structure

1. Body Hold-Downs – Inspect for securement and condition of all body hold-downs, chassis cowl mounts and frame pads. Body hold-downs include any J-bolt, U-bolt, or clamp type hold-down used to secure body to chassis frame. Make repairs if any of the following conditions exist:
 - Body hold-down is loose or misaligned, cracks or stripped fasteners at floor sill securement points.
 - Padding between frame rails and floor sills is missing or grossly misaligned.

The vehicle shall be taken out of service until repairs are made if:

- **Originally installed body hold-down or cowl mount is missing.**
- **Three or more body hold-downs are loose, misaligned or have missing hardware.**
- **Three or more body hold-downs have cracks or stripped nuts at floor sill securement point.**

2. Floor – Inspect condition of floor structure, sills, and braces. Make repairs if any of the following conditions exist:
 - There are any minor cracks in floor sills, or braces.

The vehicle shall be taken out of service until repairs are made if:

- **Holes or cracks in floor sheet metal create an opening to the passenger compartment.**
- **Entire cross-section of any floor sill or brace is broken.**
- **Any broken weld or mounting of a floor sill/brace resulting in complete separation.**
- **K-frame is cracked at the front of the body floor (between step-well and driver's area).**

3. Outriggers – Inspect body outriggers and hardware for condition and securement. Make repairs if any of the following conditions exist:
 - Any body outrigger is cracked, loose or missing hardware.

The vehicle shall be taken out of service until repairs are made if:

- **The originally installed (as required by manufacturer) outrigger is missing.**
4. Skirts – Inspect body skirts for securement and condition. Make repairs if any of the following conditions exist:
 - Body skirt brace has cracked/broken sheet metal or mounting points.
 5. Frame Rails – Inspect condition of chassis frame rails, cross-members, and all hardware attaching points. Make repairs if any of the following conditions exist:
 - ONE bolt is missing from front cross member.

The vehicle shall be taken out of service until repairs are made if:

- **There are cracks in either frame rail or cross-member.**
- **There are any loose, missing rivet or other fastener securing a cross-member to the frame.**
- **Missing more than one front cross-member bolt.**

Exhaust System

1. Exhaust Leaks – With engine running and at operating temperature, inspect exhaust system for leaks, condition, and securement. Make repairs if any of the following conditions exist:
 - There is any physical damage to exhaust system.

The vehicle shall be taken out of service until repairs are made if:

- **There is leakage which is audible or felt around any portion of the exhaust system including manifold, pipe sections or junctions.**
2. Mounting – Inspect mounting of the exhaust system. Make repairs if any of the following conditions exist:
 - Originally installed exhaust hanger missing, broken or detached from the exhaust system/frame mounting point.
 - Exhaust system not mounted at least 4 inches from non-metallic material (2008 and later year model).
 3. Muffler – Inspect condition of the muffler. Make repairs if any of the following conditions exist:
 - The muffler is cracked.
 - There is other significant physical damage to the muffler.

The vehicle shall be removed from service until repairs are made if:

- **The muffler is leaking and produces an audible sound.**
- **Exhaust is felt from the leaking area (weep hole is excluded).**

4. Tailpipe – Check the tailpipe and make sure it extends at least to the edge of the rear bumper, but no more than two inches beyond bumper or exits behind the rear tires to the left or right and extends to edge of bus body. Make repairs if any of the following conditions exist:
 - The tailpipe is cracked.
 - Other significant damage to the tailpipe.

The vehicle shall be removed from service until repairs are made if

- **The tailpipe is leaking and produces an audible sound.**
- **Exhaust is felt from the leaking area.**
- **Exhaust turn-down (1996 or newer if OEM installed) or diffuser missing (diffuser required for 2010 and newer engines).**

Wheels and Tires

1. Tread Depth – Inspect and measure all tires for tread depth and record on inspection form. Measurement shall be taken at the most worn groove of the tire. Measurement shall not be taken at a wear bar. Make repairs if any of the following conditions exist:
 - Front tire tread depth reading is at 4/32 in the most worn groove.
 - Rear tire tread depth reading is at 2/32 in the most worn groove.

The vehicle shall be taken out of service until repairs are made if:

- **Tread depth of either front tire is less than 4/32-inch in the most worn groove.**
- **Tread depth of any rear tire is less than 2/32-inch in the most worn groove.**
- **Recapped tire has been re-grooved.**
- **Front tire is a recapped or re-grooved tire.**
- **There is evidence that any tire has been re-grooved using unapproved procedure.**

2. Pressure – With tire cold, check pressures on all tires and record on inspection form. Make repairs if any of the following conditions exist:
 - Pressure in tire is less than the maximum cold inflation pressure stated on the sidewall of the tire, minus 20%; pressure in tire is greater than 5% above maximum cold inflation pressure stated on sidewall of the tire.
 - Adjust pressure if there are more than 20% differences in tire pressure on a particular axle.

The vehicle shall be taken out of service until repairs are made if:

- **Any front tire has less than 70 lbs. of air pressure.**
- **Any rear tire has less than 50 lbs. of air pressure.**

3. Damage – Inspect for damage to wheels and tires. Make repairs if any of the following conditions exist:
 - Tire is mounted so it cannot be filled with air.
 - Foreign material in the tire tread which could cause damage or loss of air pressure.
 - Valve cap or extension is missing.
 - Minor dents or bends in a rim.

Wheels and Tires, Damage (Cont'd.)

The vehicle shall be removed from service until repairs are made if:

- **Cuts, abrasion, other damage to tire sidewall resulting in exposed/ damaged cord.**
- **Separation, bulges (other than normal manufacturer bulge) or other damage within the carcass of the tire.**
- **Cracks that run around the bead or sidewall of the tire are present.**
- **Retread tire that has any separation of the tire tread from the tire carcass that could result in tire or tread failure.**
- **Valve stem is damaged.**
- **Damage to the lock ring assembly or lock ring groove of a multi-piece rim, including rust or corrosion which could cause the lock ring not to seat fully.**
- **Cracks or breaks at the lugholes or any other part of a rim or cast spokes.**
- **Dents or bends in a rim that could result in failure of a rim or separation of the tire from the rim.**

NOTE: Weather cracking shall not be only cause for rejection.

4. Matching – Inspect for matching of tire construction, tire design, tire size, and load rating on each axle. Make repairs if any of the following conditions exist:
 - There is mismatching of inner and outer dual tire diameter greater than 3/8 inch.

The vehicle shall be removed from service until repairs are made if:

- **Any tire marked for other than highway use is found.**
- **Tire is not of the proper type, size and minimum load rating (2000 and newer require “H” range).**
- **Any tire on an axle that is not of the same type(e.g., lug or rib), load range or size.**
- **Radial and bias ply tires are intermixed on the same axle.**

5. Alignment – Inspect tires for evidence of proper alignment. Make repairs if any of the following conditions exist:
 - Tire is feather-edged, cupped or tread wear is uneven.
 - If lateral run out of tire/rim assembly exceeds ¼ inch.

The vehicle shall be removed from service until repairs are made if:

- **Tires/rim are grossly misaligned and affects steering control such that vehicle will not travel in straight line.**

6. Wheel Hardware – Inspect for presence, type, condition, and securement of all wheel hardware. Check for proper spacing of rear dual wheels and tires.

The vehicle shall be removed from service until repairs are made if any of the following conditions exist:

- **Improper matching of rims and lock rings.**
- **Evidence of slippage of wheel assembly on cast spoke hub.**
- **Stud holes are elongated.**
- **Any wheel or stud is loose, rusting or corrosion indicating possible looseness.**
- **Wheel stud or lug nut is broken or missing.**
- **Improper spacer has been installed between dual wheels.**

7. Color and Condition – Paint color on wheel assemblies of North Carolina School Buses shall remain black. (Exception will be made if OEM was equipped with gray wheels) Make repairs if any of the following conditions exist:
 - If color other than black (or gray) is detected.
 - Wheels are faded.

Inside Bus

Emergency Equipment

1. Fire Extinguisher – Check fire extinguisher for presence, correct pressure, inspection sticker, tag, inspection date, mounting and accessibility, proper UL (Underwriters Laboratory) rating, nozzle for looseness, damaged parts, presence of a safety pin and tamper proof seal.

Make repairs if any of the following conditions exist:

- Loose bracket mount to panel.
- Inspection tag will expire before next scheduled inspection.
- Pressure is above the green zone.

The vehicle shall be removed from service until repairs are made if:

- **Rating is less than 2 ½ pound minimum (2002 and newer must have 5 lb. minimum and 10BC rating).**
- **No fire extinguisher on bus.**
- **Fire extinguisher pressure gauge indicates re-charge.**
- **Tamper proof seal material cannot be broken.**
- **Safety equipment storage box warning buzzer and/or ignition interlock disconnected or malfunctioning.**
- **Fire extinguisher not accessible to driver or not secured in mounting bracket/box.**

NOTE: Six years from the manufacturing date all type ABC, BC, or Halon fire extinguishers require a six year maintenance. They are also required to have a hydro-test twelve (12) years from the manufacturing date. To determine the manufacturing date, look for a stamped date on the bottom of the cylinder, on the label, or around the rim. These are required to meet National Fire Protection Association (NFPA) requirements in pamphlet #10 and OSHA requirements.

2. First Aid Kit – Check the box and condition. Check to insure that the box is labeled as First Aid Kit. Check the contents of the box for the following:

- 2 pkg. – 4-inch bandage compresses
- 2 pkg. – 2-inch bandage compresses
- 2 pkg. – 1-inch adhesive compress (16 per pkg.)
- 2 pkg. – 40-inch triangular bandage with two safety pins
- 2 sets – Plastic gloves (1 pair medium and 1 pair large)

Make repairs if any of the following conditions exist:

- Some contents are missing.

The vehicle shall be removed from service until repairs are made if:

- **Entire contents or kit are missing or unusable.**

3. Body Fluid Cleanup Kit – Check the container for condition. Check the contents of the box for the following.

- 1 – 2 oz. Package of T.I.L.S.C. powder sanitizes-deodorizes-encapsulates.
- 1 – odor reducing mask
- 1 – pair protective gloves (large)
- 2 – antiseptic wipes
- 2 – paper crepe towels
- 1 – scraper
- 1 – plastic disposal bag w/scoop and tie

Make repairs if any of the following conditions exist:

- Some contents are missing.

The vehicle shall be removed from service until repairs are made if:

- **Entire contents or kit are missing or unusable.**

4. Reflectors – Check for emergency roadside reflectors. These are required on all buses 2000 and newer. Check quantity for three reflectors. Reflector container should be securely mounted.

The vehicle shall be removed from service until repairs are made if:

- **Reflectors are missing.**
1. Seat Belt Cutter- Check for presence of a durable webbing cutter. Must be securely mounted in the driver's compartment, and within easy reach of the driver. (2002 year model and beyond) Make repairs if any of the following conditions exist:
 - No durable webbing cutter is present and properly mounted within easy reach of driver.

Neutral Safety Switch

Check to determine if automatic transmission bus has a functional neutral safety switch that will allow the starter to operate only in park or neutral.

The vehicle shall be removed from service until repairs are made if:

- **The starter will engage in any gear other than park or neutral.**

Shifter

Check that shifter operates easily, that it correctly indicates the gear that the transmission is in and has a functional detent mechanism with a ball knob (handle) on end of shift lever.

Make repairs if any of the following conditions exist:

- Shifter does not shift easily into all gears.
- Indicator is misaligned.
- Shifter has a loose ball or knob (handle).

The vehicle shall be removed from service until repairs are made if:

- **Shifter will not shift into all available gear positions.**
- **The indicator indicates wrong gear.**
- **Detent is non-functional, or if ball or knob (handle) is missing from end of shifter lever.**

Engine Controls

1. Key Switch – Check for presence of key. Remove if key is found in ignition switch. Make repairs if any of the following conditions exist:
 - The key sticks.
 - Ignition switch is loose.
 - Not mounted in OEM location.
 - Key is found in ignition when bus driver is not present.

The vehicle shall be removed from service until repairs are made if:

- **Switch operates without a key.**
- **Bus equipped with a push button or a device other than key type switch.**
- **Engine will not crank/start.**
- **Switch doesn't function properly in start, run, off or accessory position.**
- **Switch is intermittent in any position.**

2. Accelerator – Check and insure the accelerator pedal, control design and mounting securement are OEM. Inspect the pedal assembly and linkage for loose/missing hardware. All engine types must have two throttle return springs(if OEM equipped). Check for smooth operation of pedal assembly and linkage in the accelerating and coast position. Inspect for unauthorized built up pedal, (i.e., wooden blocks installed on pedal). Make repairs if any of the following conditions exist:

- Pedal cover (as originally equipped) is worn out.
- Linkage is missing.
- One return spring or is not equipped with dual return springs (external type).

The vehicle shall be removed from service until repairs are made if:

- **Pedal and assembly are not mounted securely.**
- **Control design and mounting are not of OEM design.**
- **Accelerator control and linkage sticks or doesn't operate freely.**
- **Pedal is built-up with extender block or not of OEM design.**

3. Engine Shutdown – Only OEM approved ignition controlled is shutdown acceptable on all buses. On 1985 and older buses equipped with manual engine shutdown, check for free operation of shutdown over full range with minimum effort.

The vehicle shall be removed from service until repairs are made if:

- **Engine cannot be started.**
- **Shutdown or operation is difficult.**
- **Bus was originally equipped with ignition switch type controlled shutdown and has been retrofitted with manual type shutdown.**

Gauges, Indicators, Dash Lights & Horn

1. Gauges – Check from drivers position the visibility, OEM location, readability, operation, accuracy and condition of the following gauges.

- Speedometer and odometer
- Oil Pressure
- Temperature
- Fuel
- Voltmeter and ammeter
- Air Pressure
- Tachometer

Make repairs if any of the following conditions exist:

- Fuel, voltmeter or ammeter gauges are inoperable, inaccurate, damaged, difficult to read
- Odometer inoperable or is not working properly
- Odometer unreadable
- Tachometer fails to function properly

The vehicle shall be removed from service until repairs are made if:

- **Oil or temperature warning system is not functioning or is unreadable.**
- **Speedometer doesn't work or is confirmed to be inaccurate.**
- **Speedometer is unreadable or damaged.**
- **Air pressure gauge is inaccurate, unreadable or not working.**

2. Indicators and Dash Lights – Check for the presence and operation of the following indicators.
 - Low air pressure
 - High beam light
 - Left and right turn signal and 4-way hazard
 - All dash and control panel lights for illumination at gauges and switches.
 - ABS braking system indicator light. (if equipped)
 - E-Stroke monitor. (if equipped)
 - Engine regeneration light (if equipped)
 - “Water in Fuel” light, (if equipped)

Make repairs if any of the following conditions exist:

 - Dash lights are inoperable.
 - One or more lights for the control switches are inoperable.
 - One or more panel lights is inoperable.

3. Horn – Check horn and horn button for proper operation (must be OEM design).

The vehicle shall be removed from service until repairs are made if:

- **High note horn and low note horn fails to function as designed.**

Engine Warning Lights and Buzzer

Check for presence and operation of the following warning lights and buzzer.

1. High coolant temperature dash warning light or buzzer on diesel buses.

The vehicle shall be removed from service until repairs are made if:

- **High coolant temperature warning light or buzzer is inoperative (either constant or momentary).**

2. Low oil pressure, dash warning light and buzzer on bus.

The vehicle shall be removed from service until repairs are made if:

- **The low oil pressure warning light or buzzer is inoperative (either constant or momentary).**

3. Low air warning buzzer

The vehicle shall be removed from service until repairs are made if:

- **Either the air brake warning light or buzzer is non-functioning (either constant or momentary).**

Interior Wiring, Cab Hoses and Fire Wall Seals

1. Interior Wiring – Inspect visible wiring for mounting, condition, chafing, abrasion, corrosion, loose connectors, or improper repairs. Make repairs if any of the following conditions exist:
 - Wiring or connectors are unsecured or corroded.
 - Improperly routed wiring.
 - Any connector/connection is unsecured.

The vehicle shall be removed from service until repairs are made if:

- **Any wire or connector is cut or severely chafed.**
- **Wire/conductor is exposed or routed against a sharp edge.**
- **Any interference with the driver controls.**

2. Cab Hoses – Inspect all hoses for leaks, condition, routing, abrasion and presence of heater hose shielding. Make repairs if any of the following conditions exist:
 - Hoses are weathered, cracked, or worn.
 - Improperly routed.
 - Hose is unshielded in the driver’s compartment.
3. Firewall Seals – Inspect firewall for cracks, unsealed openings and sound insulation material. Make repairs if any of the following conditions exist:
 - Sound deadening/insulation package is unsecured or deteriorated.

The vehicle shall be removed from service until repairs are made if:

 - **There are open holes or unsealed area in the firewall.**

Bus Interior

1. Floor – Inspect floor covering, plywood sub-floor (if installed), aisle and cover molding strips for condition, adhesion and/or fastening holes or cracks and ribbed rubber aisle. Make repairs if any of the following conditions exist:
 - “Watch Your Step” decal missing or unreadable.
 - Rubber floor covering loose, deteriorated, or cracked.
 - Plywood rotten or soft.
 - Cover molding loose or fasteners are missing.

The vehicle shall be removed from service until repairs are made if the following exist:

 - **Unsealed holes or cracks through the underside of the bus.**
 - **Aisle-molding strip is not securely fastened to the floor or aisle.**
 - **Cover molding presents a sharp edge or protrusion.**
 - **Any damage to the rubber floor covering which could cause a tripping hazard.**

2. Step-well – Check condition of step-well and tread. Make repairs if any of the following conditions exist:
 - Step tread not secure or sealed at inside edge where it meets the next step.
 - Step-well tread and leading edge at aisle not flush and securely adhered.
 - Step-well tread worn more than four inches in width.

The vehicle shall be removed from service until repairs are made if:

 - **Step-well support structure is broken.**
 - **Step-well is rusted through.**

3. Handrails – Check for the presence and secure mounting of entrance handrails.

The vehicle shall be removed from service until repairs are made if:

 - **Entrance handrail is missing or not securely mounted.**
 - **Handrail fails the “NHTSA String and Nut Test”.**

4. Paneling – Check all interior sidewall, rear, ceiling, and driver’s area paneling for secure fastening, projections or sharp edges, and condition. Make repairs if any of the following conditions exist:
 - Unauthorized items affixed to the interior paneling of the bus, graffiti or unauthorized stickers (seating charts and safety information are approved) on interior panels.
 - Loose or missing attachment screws on any maintenance access pane.
 - Interior paneling is mildewed or paints (where required) is missing or damaged.

The vehicle shall be removed from service until repairs are made if any of the following conditions exist:

 - **Sharp edges or rust-through in paneling.**
 - **Projections from paneling that could cause injury to passengers or driver.**

5. Loose Objects Secured – Check to insure that all objects within the bus are secure. Trash cans & brooms should not be touching the handrail area.

The vehicle shall be removed from service until repairs are made if:

- **There are any aerosol cans found in the driver/passenger compartment.**
- **Containers with flammable/volatile chemicals are found in the driver/passenger compartment.**
- **Any unlabeled container found in the driver/passenger compartment.**
- **Objects near handrail/step well area cause failure of NHTSA string & nut test.**

6. Dog House/Engine Cover – Inspect dog house/engine cover for seals, soundproofing, weather-stripping, prop-rod and latch operation. Make repairs if any of the following conditions exist:
 - Soundproofing not present or deteriorated.
 - Latch is hard to operate or does not secure dog house/engine cover properly.

The vehicle shall be removed from service until repairs are made if:

- **Seals or weather stripping allow air/fume leaks into the driver's compartment.**

7. Entrance Door/Entrance Controls (Manual and air/electric) Inspect for presence of safety pad (above door), door bumpers and weather stripping around the door. Check air door release valve for leaks. Check to see that red lights do not activate before door is opened. Make repairs if any of the following exist:

- Manual door handle locks when in opened position.
- Red lights activate before door safety latch is released. (There should be no more than 3/16-inch play in safety latch when door handle is closed).

If equipped with exterior front door lock system, inspect for function as designed by manufacturer. Make repairs if any of the following conditions exist:

- Exterior front door lock does not operate as intended.

The vehicle shall be removed from service until repairs are made if:

- **Exterior front door lock can be locked from the outside without the use of a key.**

8. Child Reminder System-Check for proper operation as designed by manufacturer. Be sure operating instructions are legible. Make repairs if any of the following conditions exist:
 - Child Reminder System does not function as designed per N.C. specification.

Windshield Wipers & Washers

1. Operation – Inspect both wipers for:
 - Swept area field of view and effectiveness of wiping
 - Proper operation of both wipers on high and low speeds
 - Condition/mounting of switches/knobs
 - Condition and mounting of wiper motors and linkage
 - Inspect for proper washer operation

Make repairs if any of the following conditions exist:

- Either wiper does not operate on low or high speed
- Wiper goes past edge of glass
- Washer does not operate or is misadjusted
- Wiper motor or linkage is visibly damaged or loose
- Switch/knob mounting is loose or missing

The vehicle shall be removed from service until repairs are made if:

- **Either wiper fails to operate.**

2. Park position – Inspect for parked position of wipers when turned off. Make repairs if any of the following conditions exist:
 - Wipers do not automatically return to parked position out of driver’s line of sight when turned off.
3. Blades – Inspect blades for condition, mounting, and tension. Make repairs if any of the following conditions exist:
 - Blades do not clean windshield properly.
 - If either blade is damaged, deteriorated, or loose.
 - Does not hold proper tension against windshield.

Heaters, Defrosters, A/C & External Driver Fan

1. Heaters – Inspect heater system for:
 - Heating performance and water control valve
 - Blower operations, condition, and control switches
 - System leaks, condition, and hose shielding
 - Condition of ductwork and heater box
 - Condition of heater filter and clean if necessary
 - Inspect for operation of rear heater booster pump (if equipped)

Make repairs if any of the following conditions exist:

- System is not producing adequate heat.
- Water control valve hard to operate.
- Heater blowers do not work on all speeds, are noisy or vibrate.
- Blower switches are damaged, loose or blower operates intermittently.
- Heater hoses are cracked, swollen, or badly chafed.
- Shielding missing or does not completely cover hoses.

The vehicle shall be removed from service until repairs are made if:

- **Any portion of heating system within the passenger area creates sharp edges, projections or other hazards to passengers.**

2. Defrosters – Inspect windshield defroster system for:
 - Airflow, heat, and coverage area.
 - Blower operations, condition, and control switches.
 - Condition of ductwork, diffusers, and fresh air control (if equipped).

The vehicle shall be removed from service until repairs are made if:

- **Defroster system does not function.**

3. Air Conditioner – Inspect A/C for:
 - A/C performance for cooling
 - Blower operations, condition, and control switches
 - System leaks, condition, and hose shielding
 - Condition of ductwork
 - Check condition of evaporator filter and clean if necessary

Make repairs if any of the following conditions exist:

- Defroster blower does not work on low or high speed.
- Blower switches are damaged or loose.
- Ductwork or diffusers are loose or damaged.
- Fresh air control (if equipped) does not function.
- Airflow is not present at all defroster outlets.

4. External Driver Fan – Inspect driver fan for:
 - Presence of fan, mounting and condition
 - Blade condition
 - Protective cage mounting and condition
 - Operation and switch.

Make repairs if any of the following conditions exist:

- Fan mounting loose or fan will not stay in adjustment.
- Fan blade damaged.
- Switch is loose.
- Fan non-operational.

The vehicle shall be removed from service if:

- **Protective cage is missing, loose, or damaged.**

Mirror Adjustments and Condition

1. Interior Rearview Mirror – Check interior rearview mirror for size, condition, and mounting. All interior mirrors shall be OEM design. Make repairs if any of the following conditions exist:
 - Any portion of reflective surface is deteriorated.
 - Mirror mounting loose.
 - Stickers or other items obstruct any portion of the driver's view.
 - Driver's view of images not clear due to distortion or other causes.

The vehicle shall be removed from service until repairs are made if:

- **Mirror is missing.**
- **Mirror is cracked.**
- **Mirror will not hold a set adjustment.**

2. Sun Visor – Check driver sun visor for condition and operation. Make repairs if any of the following conditions exist:
 - Sun visor is too tight and cannot be adjusted.
 - Driver sun visor is cracked, damaged, clouded, dirty.
 - Visor will not stay in position or has unauthorized stickers. (Cannot be altered from OEM).

The vehicle shall be removed from service until repairs are made if:

- **Sun visor is missing.**
- **Has sharp/protruding edges that could cause personal injury.**

3. Outside Rearview Mirrors – Check outside rearview mirrors for vision, condition and mounting. Check rearview mirrors to insure that the view provides the driver with a view along the left and right sides of the bus. Correct mirror adjustment will provide driver a view of rear tires at ground level and a minimum of two hundred feet to the rear of the bus. It will also provide a view at least twelve feet perpendicular to the side of the bus at a distance of thirty-two feet back from the front bumper. Make repairs if any of the following conditions exist:

- Mirrors are not in correct adjustment.
- Mounting brackets/mirror assembly is loose.
- Mounting, bracket bolts are loose.
- Mirror glass loose.
- Mounting or bracket bolts missing.

4. All mirror systems must meet criteria of and be in compliance with FMVSS111.

The vehicle shall be removed from service until repairs are made if:

- **Mirror is missing.**
 - **Mirror is cracked, pitted, clouded or deteriorated to extent vision is obscured.**
 - **Mirror will not hold set adjustment.**
 - **Mounting of mirror or bracket made by different manufacturers.**
 - **Mirror brackets are severely bent, broken, or mounting is insecure.**
5. Crossover Mirror System – Check crossover mirrors for vision, condition, and mounting. Correct adjustment will provide the driver with indirect vision of an area at ground level from the front bumper forward (12 feet) and the entire width of the bus. It will also provide the driver with indirect vision of the area at ground level around the left and right front corners of the bus, to include the tires and service entrance on all types of buses to a point it overlaps with the rear vision mirror system. Make repairs if any of the following conditions exist:
 - Mirrors are not in correct adjustment.
 - Mounting brackets or mirror assembly is loose.

The vehicle shall be removed from service until repairs are made if:

- **Mirror is missing.**
- **Mirror is cracked, pitted, clouded or deteriorated such that vision is obscured.**
- **Mounting of any mirror and bracket made by different manufacturers.**

All mirror systems must meet criteria of and be in compliance with FMVSS111

Driver's Seat and Belt

Check Driver seat and belt for condition, mounting, and operation. Make repairs if any of the following conditions exist:

- Seat (air or manual) adjustment binds or difficult to operate.
- Seat adjustment loose or adjustment hardware missing.
- Seat upholstery or foam deteriorated or damaged.
- Seat bottom loose in frame or mis-positioned.
- Seat belt retractor cover/belt covers are damaged or loose.
- Seat belt does not fully extend and retract.
- Seat belt tethers must be present (if required) and properly secured per driver seat adjustment.

The vehicle shall be removed from service until repairs are made if any of the following conditions exist:

- **Seat frame and mounts are cracked, broken or distorted.**
- **Seat moved from OEM position.**
- **Driver seat belt is missing or inoperable.**
- **Seat belt is routed improperly.**
- **Seat belt buckle and tongue assemblies do not latch and release properly.**
- **Driver seat belt tether missing or not properly connected.**

Passenger Seats

1. Frames – Inspect passenger seat frames for condition of welds, tubing, and hardware. Check for presence of non-OEM seat frames. Make repairs if any of the following conditions exist:
 - Seat back frame is repaired using non-OEM hardware.

The vehicle shall be removed from service until repairs are made if:

- **Seat frames or welds are broken or cracked.**
- **Seat frame hardware has been added or modified which results in projections or sharp edges.**
- **Non-OEM seat frames have been installed.**

2. Mounting – Inspect condition of passenger seat mounting. Make repairs if:
 - Seat mounting at floor or seat rail is loose.

The vehicle shall be removed from service until repairs are made if:

- **Any seat mounting fasteners are of lower grade or different type than OEM fasteners for the specific locations.**

3. Pads – Inspect seat back foam for specifications and condition. All North Carolina School Buses must meet FMVSS222. Check for thickness and density of foam around frame. Make repairs if any of the following conditions exist:
 - Any portion of seat frame is felt through the foam when pressing down on seat back top.
 - Any portion of seat foam is damaged.

The vehicle shall be removed from service until repairs are made if:

- **Any portion of seat/safety barrier foam is missing and the seat/ safety barrier framing (metal/wood) is visible or can be felt directly through the cover.**

4. Cuts (and other upholstery damage) – Inspect seat upholstery for condition and damage. Make repairs if any of the following conditions exist:
 - Seat upholstery cut or torn and foam is visible through cut.
 - Seat upholstery not repaired properly.

The vehicle shall be removed from service until repairs are made if:

- **Any vehicle that came equipped with fire-block upholstery (all lift buses and all others manufactured after late 1996) has been retrofitted with upholstery other than fire-block.**

5. Bottoms & Flip-Up Seat –To remain in compliance with FMVSS222 all seat bottoms must be secured and remain secured when students are transported. Make repairs if any of the following conditions exist:
 - Seat bottom is not securely anchored to seat frame.
 - Seat bottom padding/cover has damage and deterioration.
6. Inspect flip-up type seat bottom at side emergency door (if equipped) for proper operation. There must be clear access to the emergency door with a minimum aisle width of twelve (12) inches between seats.

The vehicle shall be removed from service until repairs are made if any of the following conditions exist:

- **Not a clear minimum twelve- (12) inch aisle width to the side emergency door.**
- **Flip-up seat bottom will not raise or lower.**
- **Will not stay in the raised position or automatically retract properly when not occupied.**

7. Modesty Panels & Safety Barrier – Inspect modesty panels and safety barrier for condition, mounting, and padding. Make repairs if any of the following conditions exist:
 - Covering or padding damaged.
 - Mounting frame or attaching hardware missing/damaged.

The vehicle shall be removed from service until repairs are made if:

- **Bus is not equipped with a padded safety barrier in front of any passenger seat that does not have another seat in front of it.**
- **Fire-blocking crash barrier fabric is repaired or replaced using unapproved procedures or non-fire blocking material.**

Emergency Door / Window / Hatches

1. Operation – Inspect for operation and condition of rear emergency door and side door, door latch, door hold open feature (if equipped), door seal, emergency windows and emergency exits/ventilator (roof hatches). Make repairs if any of the following conditions exist:
 - Rear door opens too far and damages lights.
 - Door handle, latch or mounting hardware loose.
 - Mounting of guard for inside rear door handle loose.
 - Emergency door latch does not operate smoothly and easily when closing or opening.
 - Door hold open feature (if equipped) does not function or secure door in the open position.
 - Inside door handle is not equipped with a guard.
 - Emergency door does not open and close from the inside and outside easily.
 - Weather-strip seal is damaged or does not seal properly.
 - Roof hatch seal is damaged or dislodged.
 - Roof hatch does not open easily to full “emergency open” position.

The vehicle shall be removed from service until repairs are made if:

- **Emergency door or window will not open properly.**
- **Is equipped with any type of a hasp, lock, or any other locking device (except for OEM interlock system).**
- **Bus will start with any emergency door locked (OEM interlock system).**
- **Latch mechanism will not secure door, hatch, or window in closed position.**

2. Buzzers – Check operation of buzzers for emergency doors, emergency exit windows and emergency exit roof hatches. Make repairs if any of the following conditions exist:
 - Buzzer fails to operate or gives false alarms.

The vehicle shall be removed from service until repairs are made if:

- **Emergency exit buzzer circuit fails to operate.**
- **Emergency door fails to operate panel buzzer.**

3. Labeling and Pad – Inspect for label and opening instructions for emergency door, emergency windows, and emergency exit/ventilator (roof hatch). Make repairs if any of the following conditions exist:
 - Emergency exits are not clearly labeled inside and outside the bus, within 6 inches of the handle, as “Emergency Door” or “Emergency Exit”.
 - Emergency door, emergency windows, or emergency exit roof hatches do not have readable instructions for operation on the inside of the exit (or readable from the inside).
 - Emergency exit door pad is ripped or has loose mounting.
 - Door pad is missing or has any protruding edge.

Windshield, Side & Rear Windows

1. Glass cracks – Inspect windshield and all windows for cracks and other damage. Make repairs if any of the following conditions exist:
 - Windshield cracks in the driver’s direct field of vision or any pock marks that obstruct the driver’s vision or any pock mark larger than a quarter anywhere on windshield.
 - Cracks in the windshield or any window, greater than two inches in length.
 - Crack in non- laminated safety glass.

The vehicle shall be removed from service until repairs are made if any of the following conditions exist:

- **Glass is missing.**
 - **Laminated windshield or laminated window glass is broken or splintered that might cause injury when touched.**
2. Fogging – Check windshield and windows for fogging and reduced visibility or improper level of tinting. Make repairs if any of the following conditions exist:
 - Glass is starting to fog around the edges or is reduced in visibility through the windshield or any windows.

The vehicle shall be removed from service until repairs are made if:

- **Windshield or any window that provides visibility to any mirror is fogged more than two inches in from the outer border.**
 - **Windshield /window fogging or clouding results in reduced visibility of a mirror.**
 - **Tinting on the windshield or windows to the side of the driver does not meet year specific NC School Bus specifications.**
3. Latches and Window Operation – Check latches and windows for condition and operation. Make repairs if any of the following conditions exist:
 - Latches are hard to operate or any window does not move up and down freely.
 - Windows do not stay closed.
 - Window will not move (full travel) up and down.

The vehicle shall be removed from service if:

- **There is any loose, damaged, or protruding window hardware that would be a hazard to passengers.**
5. View Blockage-No object shall block driver view through any glass surface in the immediate driver area. (Driver seat 90 degrees left or right)

The vehicle shall be removed from service until repairs are made if:

- **Driver view is obstructed by objects or stickers.**
4. Body Glass – Check all body glass, gaskets and frames for cracks, discoloration and looseness. Make repairs if any of the following conditions exist:
 - Any side glass is cracked, loose or discolored.

The vehicle shall be removed from service until repairs are made if:

- **Windshield glass is cracked and could be dislodged.**
- **Glass is discolored and prevents driver from having clear visibility.**
- **Glass is missing.**
- **Any piece of glass is non-OEM.**

Lift, Door and Securement System

1. Operate lift through complete cycle and inspect for proper operation, condition, safety features, manual backup system, fluid leaks, mounting, barrier operation, warning light, buzzer operation and overall condition. Make repairs if any of the following conditions exist:

- Dome light at inside lift area inoperative.
- Lift door or latch does not operate smoothly.
- Fluid seepage at the lift.
- White light (if equipped) at exterior lift area inoperative.
- Lift control cable or wiring damaged or routed improperly.
- Lift does not fold, unfold, lift and lower properly.
- Lift jerks or binds.
- Lift leaks fluid onto or below floor.
- There is excessive side play (more than two inches) in the lift mechanism when the platform is partially or fully extended.
- Lift jacks up the vehicle.
- Manual backup system does not function properly.

The vehicle shall be removed from service for wheelchair/lift operations until repairs are made if:

- **Elevator lift platform is not flush with floor in “up” position.**
- **Any part of the lift mechanism or hardware is damaged, missing, or not secure including cams, clips, pins, rollers, and platform fasteners.**
- **Wheelchair lift will not operate as designed.**

2. Inspect wheelchair and occupant securement (tie-down) system for condition, mounting, proper type, and location. Make repairs if any of the following conditions exist:

- Wheelchair tie down track is filled with debris.

The vehicle shall be removed from service for wheelchair/lift operations until repairs are made if:

- **Wheelchair or occupant securement straps are broken or frayed.**
- **Wheelchair tie down track or fasteners are loose or broken.**
- **Wheelchair or occupant securement track mounted using lag type bolts or sheet metal screws.**

3. Check for presence of a durable webbing cutter on all buses equipped with restraining devices or wheelchair positions. Must be securely mounted in the driver’s compartment, and within easy reach of the driver.

The vehicle shall be removed from service for until repairs are made if:

- **Belt Cutter is missing (Wheelchair equipped vehicles).**

Outside Bus

All Exterior Lights and Backup Alarm

LED lights-Check for normal operation of light unit. Check lenses for cracks and clarity. Make repairs if any of the following conditions exist:

- Any LEDs are not operating in a light unit. (Eight Light Warning Lamps Require 100% of LEDs Operating).

1. Headlights – Check both headlights for brightness, operation, condition of sealed beams and proper aiming. Check high beam indicator operation and headlight switch. Make repairs if any of the following conditions exist:
 - Left and right sealed beams are different type (halogen vs. conventional).
 - Sealed beam does not operate on low and high.
 - Sealed beam lens foggy, cracked, or light is dim.
 - High beam indicator does not function.
 - Any improperly aimed headlights.
 - Dimmer switch sticks, hard to operate or doesn't function.
 - Headlight switch is damaged and/or not securely mounted.
 - Knob is missing.

The vehicle shall be removed from service until repairs are made if:

- **Lights go out after being on a short time.**
- **Operation is intermittent.**
- **High Beam or Low Beam headlight circuit fails to operate.**

2. Turn Signals – Check turn signals (including bulbs and lenses) for operation and condition. Make repairs if any of the following conditions exist:
 - Front, rear or side-mounted turn signal lens is cracked.
 - Front, top of fender, rear, or side-mounted turn signal does not flash or is dim.
 - Turn signal indicator does not properly indicate right and left.
 - Turn signal switch does not function properly or will not maintain set position.
 - Turn signal switch does not cancel or return to neutral position.
 - Front, rear or side mounted turn signal lens is damaged or white light is visible.
 - Any turn signal lens has darkened, faded or dirty significantly affecting visibility or color of the light.
 - Front signals fail to operate.

The vehicle shall be removed from service until repairs are made if:

- **A rear turn signal fails to operate.**

3. Hazard Lights – Check hazard lights for operation and condition. Make repairs if any of the following conditions exist:
 - Lens is cracked, darkened or dirty.
 - Four-way hazard light fails to function.
 - Hazard switch does not function or will not maintain set position with steering wheel in the straight-ahead position.
4. Side Marker Lights – Check side marker lights (if installed) for operation and condition. Make repairs if any of the following conditions exist:
 - Side marker light fails to function.
 - Is cracked/damaged/darkened.

For LED lights, replacement unit must be same as year model specification or newer

5. Brake Lights – Check brake lights and lens for operation and condition. Make repairs if any of the following conditions exist:
 - Any brake light fails to function.
 - Brake light lens is cracked/damaged.
 - White light is visible.
 - Brake light lens is darkened, faded or dirty significantly affecting the visibility or color of the light.

The vehicle shall be removed from service until repairs are made if:

- **Brake light circuit fails to function.**
- **Brake pedal is in released and brake light switch sticks or lights stay on.**
- **Brake light lens is not red or is not proper type meeting SAE specifications.**

6. Tail Lights – Check tail light and lens for operation and condition. Make repairs if any of the following conditions exist:
 - Tail light fails to function.
 - Tail light lens is cracked.
 - Tail light lens is darkened, faded or dirty significantly affecting the visibility/color of the light; tail light lens is damaged.
 - White light is visible.

The vehicle shall be removed from service until repairs are made if:

- **Tail light circuit fails to function.**
- **Tail light lens is not red.**
- **Tail light lens is not proper type meeting SAE specs.**

7. Backup Lights – Check backup lights for proper operation and condition. Make repairs if:
 - Either backup light doesn't function or if any backup lens is cracked.

The vehicle shall be removed from service until repairs are made if:

- **Backup lights stay on in any gear position other than reverse.**

8. Backup Alarm – Check operation and condition of backup alarm. Check operation by placing transmission selector in reverse gear (engine running) and listening for audible alarm sound. Make repairs if any of the following conditions exist:
 - Backup alarm doesn't function properly. (Backup alarms required on all 1997 and newer buses).
9. Parking Lights – Check parking lights for proper operation. Make repairs if any of the following conditions exist:
 - Any of the parking lights are inoperable.
 - Any park light lens is cracked / broken / darkened.

Clearance Lights, Reflectors & Strobe Light

1. Clearance and Marker Lights – Check lights and lens for operation, condition, and location. Make repairs if any of the following conditions exist:
 - Clearance light fails to function.
 - Clearance light lens damaged or white light visible.
 - Rear clearance light lens not red.
 - Intermediate or front lens not amber.
 - Clearance light lens has darkened, faded or dirty which significantly affects the visibility or color of the light.

2. Reflectors – Check reflectors for condition and location.
Reflectors are required as follows:
 - Buses over 30' in length
 - Two- (2) red on rear, one (1) intermediate amber on side
 - Buses under 30' in length: is same, except intermediate amber is not required.
 Make repairs if any of the following conditions exist:
 - Reflector is damaged or cracked.
 - Required reflectors are missing.
 - Reflector is faded significantly affecting its original color.

3. Strobe Light- Check roof mounted white flashing strobe light for operation, location and condition. (Strobe lights required on all 1998 and newer buses). Make repairs if any of the following conditions exist:
 - The strobe light does not function.

Eight Light System, Stop Arm & Crossing Arm

Eight Light Warning Lamps Require 100% of LEDs Operating

1. Eight Light Warning System Lights – Check eight light warning system lights for operation and condition. Make repairs if any of the following conditions exist:
 - Amber or red pilot light fails to function.
 - Light hood (if equipped) is damaged so that it obstructs visibility of the light.
 - LED lights are not set to strobe feature (if equipped with strobe/flash switch).

The vehicle shall be removed from service until repairs are made if:

- **Amber or red light does not function or is dim.**
 - **Amber/red lights (both front and rear) do not alternately flash (side to side).**
 - **Warning light is not red (outer) or amber (inner) or is not the proper type.**
 - **Warning light lens is damaged or improper lens installed.**
 - **White light is visible.**
 - **Warning light lens has darkened, faded, misaimed, or dirty affecting the color of the light or reducing the visibility to less than 500 feet in bright sunlight.**
 - **Warning lights do not function as designed.**
2. Stop Arm – Check stop arm for specifications, operation (fully extends to 90 degrees), and condition. Make repairs if any of the following conditions exist:
 - Any LED's fail to function.
 - Wiring ground strap loose or not properly routed and secured.
 - Hinge or bushing is dry of lubrication.
 - Stop arm assembly or blade mounting loose.
 - Stop arm extends more or less than 90 degrees.
 - Stop arm does not fully extend or retract or is slow.
 - Air operated stop arm diaphragm has air leak.
 - Stop arm (paint or decal) is significantly faded or discolored.

The vehicle shall be removed from service until repairs are made if:

- **Stop arm light does not operate.**
- **Does not flash between 60 and 120 times per minute.**
- **Stop arm does not operate as designed.**

3. Crossing Control Arm –Check front bumper mounted student crossing arm for operation, condition, mounting and retention device (i.e. magnet).

Make repairs if any of the following conditions exist:

- Crossing arm mount bolts loose.
- Hinge bushings need lubrication or are damaged.
- Air leaks from air operated diaphragm.
- Arm does not fully extend (90 degrees).
- Arm is improper height (level with bumper) when out.
- Retention device not operating properly.

The vehicle shall be removed from service until repairs are made if:

- **Bus is not equipped with a student crossing arm assembly and arm.**
- **Crossing arm does not extend 60 degrees from bumper.**
- **Crossing arm does not deploy when stop arm is activated.**

Bus Exterior

1. Bumpers – Check bumpers for mounting, condition, color, reflective tape (if equipped) and body seal (rear bumper). If bus is equipped with reflective strip on rear bumper, no other stickers are allowed to cover reflective strip (except vinyl reflective type). Make repairs if any of the following conditions exist:

- Bumper is not black.
- Bumper is equipped with any unauthorized stickers or decals (only stickers approved by DPI Transportation Services are to be installed).
- Bumper has bent brackets/braces.

The vehicle shall be removed from service until repairs are made if:

- **Bumper is significantly bent.**
- **Bumper has protruding metal.**
- **Bumper-mounting system is cracked or broken.**
- **Bumper has cracked welds.**
- **Bumper has missing or loose fasteners.**

2. Body Damage – Check body exterior for accident damage, scratches, dents, etc. Make repairs if any of the following conditions exist:

- Body has small dents, scratches, etc. or has rusted spots.

The vehicle shall be removed from service until repairs are made if:

- **Body part damaged/dislocated creating a protrusion or sharp edge.**
- **Body panels, rivets, or other components are damaged/corroded to the point where joint strength or body structural integrity is compromised.**

3. Paint – Check the paint on body and trim for required coloration and condition. Make repairs if any of the following conditions exist:

- Paint is faded, discolored, rusted, or damaged.

The vehicle shall be removed from service until repairs are made if:

- **Paint is not National School Bus Yellow.**
- **Warning light hoods and background are not black.**

4. Reflective Markings – Check reflective markings for coloration, reflectivity and condition. Make repairs if any of the following conditions exist:

- Reflective markings are faded, discolored, damaged or peeling.

The vehicle shall be removed from service until repairs are made if:

- **Reflective markings are missing around any emergency exit or door. (Reflective markings required on 1995 and newer buses).**

5. Lettering – Check all lettering for required type, size, location, and color.

The vehicle shall be removed from service until repairs are made if bus is not equipped with the following lettering or they are not legible:

- **“School Bus” (8” letters) on front and rear.**
- **“North Carolina Public Schools” (6” letters) on both sides. (5” before 1997).**
- **“County or School Unit Name” (3” letters) below “North Carolina Public Schools” on both sides.**
- **“Bus Number” (6” letters) on front sides and rear.**
- **“Emergency Door” (2” letters) on all emergency doors.**

6. Emergency Door Operation – Check emergency door for operation from exterior of bus. Make repairs if any of the following conditions exist:

- Emergency door latch mechanisms or hinges need lubrication.

The vehicle shall be removed from service until repairs are made if any of the following conditions exist:

- **Emergency door latch mechanism stuck or requires more than 40 lbs. to release.**
- **Emergency door handle is mounted horizontally to allow “hitching” onto the bus.**

7. Engine Hood – Check hood for operation, condition, and safety latch. Make repairs if any of the following conditions exist:

- Hood is misaligned or rubbing cowl.
- Hood is rubbing air filter assembly.
- Hood hinges are not lubricated or are damaged.
- Bumper or securement device is damaged or missing.

The vehicle shall be removed from service until repairs are made if any of the following conditions exist:

- **Hood cannot be opened as designed.**
- **Hood cannot be secured.**
- **Safety latch does not secure hood.**
- **Hood prop rod or hold open feature does not function properly.**

8. Cleanliness – Check exterior of bus for cleanliness. Make repairs if any of the following conditions exist:

- The exterior of the bus is dirty.

The vehicle shall be removed from service if:

- **The bus is dirty to the point that visibility through any window or light lens is significantly reduced.**

Road Test

Road Test – Every bus is required to have a road test when monthly inspections are performed. The following items shall be checked during the road test.

1. Travel angle – The travel angle shall be checked while the vehicle is being driven. Observe centerline on highway and check for side evenness to centerline.

The vehicle shall be taken out of service until repairs are made if:

- **Travel angle is uneven.**

2. Steering Gear Operation – Check steering gear for smooth operation, lost motion, and shimmy. Refer to chart on page 15 for maximum free play in steering. The vehicle shall be removed from service until repairs are made if:
 - Free play exceeds maximum allowable amount.
 - Excessive tire shimmy occurs.
 - Roughness is detected in steering gear.

3. Engine Performance – Check engine for acceleration, smooth operation, noise in engine or valve train, and excessive smoke. Make repairs if engine fails to operate efficiently. **The vehicle shall be removed from service if:**
 - **Excessive noise is detected or if engine fails to operate properly.**

4. Rear axle and driveline – Check rear axle and driveline for vibration and noise.
 - Make repairs if noise is detected.**The vehicle shall be removed from service until repairs are made if:**
 - **Excessive noise and vibration are detected.**

5. Transmission – Check transmission operation for up-shift, downshift and slippage.
 - Make repairs if rough up-shift or downshift is experienced.**The vehicle shall be removed from service until repairs are made if:**
 - **Transmission is slipping.**

6. Road Speed Control – Check road speed control for proper operation. Check operation for high limit cut-off and low limit cut-in. Make repairs if any of the following conditions exist:
 - High limit is 48 mph or above and if low cut-in is 42 or below.**The vehicle shall be removed from service until repairs are made if:**
 - **Road speed control fails to operate or allows vehicle to exceed 50 MPH.**

7. Instrument Gauges, Speedometer, and Odometer – Check all instrument gauges for proper operation. Make repairs if any gauge fails to operate properly. Check speedometer and odometer for proper operation. Make repairs if any of the following conditions exist:
 - Speedometer needle is erratic or if odometer fails to operate.**The vehicle shall be removed from service until repairs are made if:**
 - **Speedometer fails to operate.**

8. Service Brake Check-Check for smooth even operation. Bus should not pull left or right or veer from original lane of travel when brakes are applied.

Brake Testing Procedure

- Highly recommended to be incorporated in 30-day inspections.

Inspection criteria for this section are based upon Federal Motor Carrier Safety Regulations.

An inspector or technician on all school buses shall perform a brake performance test when PM services are conducted. A consistent method for brake testing is to use a brake-testing device during each 30-day inspection and record braking efficiency on an inspection form. A reading between 60-65 percent should result in further investigation of the braking system by the technician. This brake performance test will not override any other defect found during the brake inspection. **REGARDLESS OF THE TYPE OF BRAKING SYSTEM USED ON THE BUS, IT MUST BE ABLE TO PRODUCE A BRAKING EFFICIENCY OF AT LEAST 60 PERCENT UNLOADED.**

The vehicle shall be removed from service until repairs are made if:

- **Brake reading is below 60 percent.**

APPENDIX A- OUT OF SERVICE CRITERIA – QUICK REFERENCE

The vehicle shall be removed from service until repairs are made if:

BRAKES

- 1) Air pressure gauge(s) are not working.
- 2) The air compressor governor cutout pressure is too low (below 100 psi).
- 3) The air compressor governor cutout pressure is too high (above 130 psi).
- 4) Park brake doesn't hold or functions improperly.
- 5) Pressure leaks more than 2 psi per minute (brakes not applied).
- 6) Pressure leaks more than 3 psi per minute (with service brake applied).
- 7) Low air warning light is inoperative.
- 8) Low air warning buzzer is inoperative.
- 9) Buzzer or light fails to operate by 60 psi or continues to operate above 70 psi.
- 10) Any leaks are found in the brake or hydraulic system.
- 11) Warning light fails to operate.
- 12) Brake pedal (reserve) is less than one inch from floor.
- 13) There is any brake pedal fade (falling away) after initial firm application.
- 14) Rubber cover pad is missing or severely worn.
- 15) Emergency brake control assembly is hard to operate.
- 16) Emergency brake control assembly doesn't latch and release properly.
- 17) Evidence of fresh oil is found on the brake linings, drums or rotors.
- 18) Any brake hose or connection is leaking fluid or air pressure.
- 19) Any brake hose is kinked, collapsed or bulging.
- 20) Any brake hose has damaged plies, cords or is damaged below outer covering.
- 21) If brake line is crimped or damaged significantly and restricting air pressure or hydraulic fluid.
- 22) Brake line or connection is leaking air pressure or hydraulic fluid.
- 23) Brake chamber-mounting bracket is cracked, bent or broken.
- 24) If either brake chamber is not of the original size.
- 25) If size of chambers is not matched left and right (both sides must be the same size).
- 26) If non-manufactured holes are found in the spring brake housing.
- 27) Any portion of the slack adjuster or S-cam is missing, broken, cracked, or badly worn.
- 28) S-cam snap ring is missing.
- 29) Slack adjuster has a frozen or stripped worm gear or ratchet assembly.
- 30) Any portion of the pushrod assembly (locknut, pushrod, clevis and pin, or cotter pin) is loose, missing or damaged.
- 31) Non-OEM clevis installed (welded vs non-welded).
- 32) Any automatic slack adjuster arm or mechanism is damaged or loose.
- 33) Brake lining is broken, cracked, or loose on shoe.
- 34) Brake shoe platform or webbing is cracked/damaged.
- 35) There is any loose, damaged, or missing foundation brake hardware within the drum.
- 36) Brake shoe friction surface is contaminated with oil, grease, or brake fluid.
- 37) Brake lining with a thickness less than 3/16 inch on a continuous lining or 1/4" for a shoe with two pads. (IF EQUIPPED WITH DISC STYLE BRAKES, MINIMUM IS 1/8").
- 38) There is any grease, oil or brake fluid on the inside of the drum.

BRAKES (Cont'd)

- 39) Any drum is not mounted securely to hub.
- 40) Drum fasteners are loose.
- 41) Drums have external crack or cracks that open upon brake application.
- 42) Brake rotor mounting is not secure.
- 43) Brake rotor friction surface is contaminated with oil, grease, or brake fluid.
- 44) Any brake rotor friction surface is significantly grooved or damaged.
- 45) Any wheel cylinder or caliper is not securely mounted.
- 46) Loose or missing caliper fasteners.
- 47) Rotor/ drum damage is observed.
- 48) Wheel cylinder /caliper is sticking.
- 49) There is any damage or condition that prevents proper adjustment of S-cam or air disc type brakes.
- 50) Air tank safety valve leaks or does not release pressure.
- 51) Excessive sludge or oil contamination in the air reservoir (more than (8) fluid ounces).
- 52) Air reservoir is cracked or leaks due to corrosion.
- 53) Regular Chamber Type 16, 1-3/4" maximum.
- 54) Regular Chamber Type 24, 1-3/4" maximum.
- 55) Regular Chamber Type 30, 2" maximum.
- 56) Long Stroke Type 16, 2" maximum.
- 57) Long Stroke Type 24, 2" maximum.
- 58) Long Stroke Type 30, 2.5" maximum.

STEERING

- 59) 16" steering wheel or less, 4-1/2" maximum lash.
- 60) 18" steering wheel, 4-3/4" maximum lash.
- 61) 20" steering wheel, 5-1/4" maximum lash.
- 62) 22" steering wheel, 5-3/4" maximum lash.
- 63) Side-to-side play in steering column exceeds 1/4 inch or up and down play exceeds one (1) inch.
- 64) Column assembly mounting (including floor mounting plate) or fasteners are loose.
- 65) Tilt/telescopic assembly (if equipped) will not stay in the locked position.
- 66) Steering column U-joint inside the bus (if equipped) is loose, damaged, or noisy after lubrication.
- 67) Flexible coupling, if equipped (rag joint) has loose or missing fasteners, damaged flexible disc, or elongated holes.
- 68) Any column U-joint, pinch bolt, other column fasteners, or input shaft coupling is loose, damaged, or missing.
- 69) Steering gearbox is loose on frame, or fasteners or lock tabs are loose or missing.
- 70) If the boot is found damaged or torn.
- 71) Steering gear box is loose or any mounting bolts are missing.
- 72) If there is any binding in steering gear box.
- 73) If any play is observed between pitman arm and sector shaft.
- 74) If pinch bolt at sector shaft is loose or missing.
- 75) If pitman arm to sector shaft timing marks are misaligned.
- 76) Drag link ball stud is loose in pitman arm or upper steering arm.

STEERING (Cont'd)

- 77) Any nut is loose or missing.
- 78) Any cotter pin is missing.
- 79) Drag link shaft is damaged or bent.
- 80) Drag link end (non-adjustable type) has more than 1/8" axial play (non-rotational).
- 81) Horizontal socket type (adjustable) drag link has more than 1/8" axial or lateral play.
- 82) Any steering arm has been bent, is cracked or is damaged.
- 83) Any steering arm attachment point is loose, or any fasteners, or cotter pin is missing
- 84) If either steering stop or lock is loose, damaged or missing.
- 85) Tie rod clamp, fasteners, or cotter pins is stripped, missing, or loose.
- 86) Any clamp (as equipped) is out of position.
- 87) Any tie rod end is cracked or damaged.
- 88) Any tie rod end has more than 1/8" axial play.
- 89) Tie rod end ball stud is loose in steering arm or idler arm.
- 90) Any idler arm fasteners are loose or missing.
- 91) Idler arm is cracked, damaged, or cotter pin is missing.
- 92) Idler arm up and down play is greater than 1/4" total (1/8" in either direction).

BATTERY

- 93) Battery hold down assembly is corroded, or damaged causing insecure mounting of battery.
- 94) Cable, wiring, connector or insulation is cracked enough to expose internal wiring.
- 95) Wire/conductor is exposed to or routed against a sharp edge.
- 96) Wire/conductor is exposed to or routed against exhaust or extremely hot surface.
- 97) Cable is smaller than original equipment size.
- 98) Pass through grommet is missing.
- 99) The battery is cracked or damaged it shall be replaced before operating.
- 100) Battery tray is not locked in place.
- 101) Battery box door does not open or will not stay latched as designed.
- 102) Battery slide tray or box is damaged or deteriorated reducing security of batteries.

ENGINE

- 103) Evidence of a fresh brake fluid leak is detected.
- 104) Brake fluid is excessively low (less than 1/4 full).
- 105) Power steering fluid is excessively low (less than 1/4 full).
- 106) No engine oil is observed on dipstick.
- 107) There is evidence of fuel or water contamination in the engine oil.
- 108) If the engine oil dipstick is missing.
- 109) The transmission fluid is not present on dipstick, or is above the full mark (overfilled).
- 110) If the transmission dipstick is missing.
- 111) Engine Coolant cannot be seen in reservoir or in radiator tank with cap removed.
- 112) Fresh engine oil is found on any portion of exhaust system.
- 113) Coolant leakage is excessive and could result in engine failure.
- 114) Fresh transmission fluid is found on any portion of the exhaust system.
- 115) If power steering fluid is dripping.
- 116) Any belt tensioner that does not pivot or move freely and apply spring pressure on belt.
- 117) Any tension on belts that is too loose (based on specifications of type tension gauge used).

STEERING (Cont'd)

- 118) Tension of any belt (using ruler method) that is too loose when firm pressure is applied (greater than $\frac{3}{4}$ inch deflection).
- 119) Any belt slippage is detected.
- 120) The diesel air filter restriction exceeds manufacturer's specifications.
- 121) The air filter minder is missing.
- 122) Any portion of the power steering pump, mounting brackets or fasteners is cracked, loose or missing.
- 123) Air compressor mounting brackets or fasteners is cracked, loose or missing.
- 124) Water pump is noisy.
- 125) Water pump bearing is damaged.
- 126) If coolant is leaking out of the water pump.
- 127) Engine cooling fan has any cracked, bent, or broken blades.
- 128) Any portion of engine cooling fan mounting is loose.
- 129) Engine cooling fan clutch is seized or loose.
- 130) Any portion of the alternator, mounting brackets or fastener is cracked/loose/missing.
- 131) There is any unsecured or poorly routed wiring that could cause a potential short or fire due to abrasion or heat damage.
- 132) There is burnt wiring, or wiring missing insulation (other than ground wires) is present.
- 133) Any fuel system connection is stripped, loose, cracked, or leaking.
- 134) Any fuel line or hose is unsecured or poorly routed such that it could cause fire.
- 135) The engine coolant radiator cap is missing.
- 136) Engine cooling fan shroud is missing.
- 137) Engine cooling fan shroud is loosely mounted and could cause damage to fan blades or drive belt(s).

CHASSIS

- 138) There is any noise, binding, or roughness discovered in wheel bearings.
- 139) Wheel bearing endplay exceeds manufacturer's specifications (maximum of .010" in and out play measured at bearing hub).
- 140) I-beam has been cut, modified or damaged (other than qualified machine shop to repair axle eye).
- 141) There is any bluing or other evidence that the I-beam has been heated.
- 142) King pin locking pin is backing out, loose, or missing.
- 143) Kingpin movement is more than $\frac{1}{4}$ inch measured at the outside edge of the tire.
- 144) Vertical (up and down) play in kingpin assembly is greater than .030".
- 145) Thrust bearing is damaged or missing.
- 146) Any spring shackle or hanger is loose, cracked, broken.
- 147) Any spring mount-to-frame fastener is loose, missing, broken, cracked.
- 148) Frame is cracked at any spring mounting location.
- 149) Pinch bolt is stripped or missing so that spring pin cannot be clamped tightly.
- 150) Pin and bushing wear exceeds $\frac{1}{4}$ inch.
- 151) Bushing is missing.
- 152) A-frame assembly is bent, missing or broken.
- 153) A-frame fasteners/u-bolts are loose or missing.
- 154) Mounting of A-frame bushing assembly is not secure.
- 155) A-frame rubber bushing is missing.

CHASSIS (Cont'd)

- 156) A-frame, bushing or pivot arm has more than .050 free play at pivot point.**
- 157) Ball joint mounting is loose or missing.**
- 158) Cotter pin is missing.**
- 159) Ball joint to A-frame mounting is cracked, loose or has been welded.**
- 160) Any shock mount bracket, U-bolt, seating plate or nut is loose, missing, cracked or stripped.**
- 161) Any shock absorber is broken or missing.**
- 162) Either front leaf spring saddle is missing (if equipped).**
- 163) Any leaf spring is broken, cracked or missing.**
- 164) Spring eye is worn or spread such that bushings are loose in spring eye.**
- 165) Coil spring is broken or insecurely mounted.**
- 166) Non-OEM leaf spring blocks or spacers are installed.**
- 167) There is misalignment of spring leaves or other evidence that center pin is loose or broken.**
- 168) Either front coil or leaf spring is worn so that the rubber frame bumper is damaged or worn due to frequent bottoming of front suspension.**
- 169) Alignment wedge is loose or damaged.**
- 170) Air bag type spring assembly is damaged/leaking.**
- 171) Transmission is not mounted securely to flywheel housing.**
- 172) External indication that any torque converter bolt is loose or missing.**
- 173) Transmission linkage is bent, damaged, binding or severely misadjusted.**
- 174) Transmission linkage hardware or fasteners are missing.**
- 175) Transmission linkage is damaged so as to cause it to stick or bind.**
- 176) Transmission modulator vacuum hose is leaking or not connected.**
- 177) The body of the transmission filter housing, including all hose connections, are cracked or damaged.**
- 178) The clutch cannot be adjusted to specifications.**
- 179) Release bearing is excessively noisy.**
- 180) Clutch is slipping, grabbing, or has excessive chatter when engaging clutch.**
- 181) Clutch linkage or return spring is binding or sticking.**
- 182) Transmission is hard to shift.**
- 183) The clutch pedal cover pad is missing.**
- 184) There is a built up extender block not of OEM design.**
- 185) Either master or slave cylinder is leaking or inoperable.**
- 186) Fuel leakage from the tank.**
- 187) Fuel cap is missing.**
- 188) Fuel tank has any cracks.**
- 189) Fuel line connections are loose at the tank.**
- 190) Any portion of fuel tank mounting system is missing, loose, cracked, or broken (including support brackets, retaining straps, and chassis frame).**
- 191) Fuel tank mounting fasteners are loose or missing.**
- 192) Fuel tank crash barrier assembly is damaged, insecurely mounted or missing.**
- 193) Fuel line or hose is unsecured or is routed subject to excessive heat or abrasion.**
- 194) Fuel line or hose is deteriorated or damaged.**
- 195) Fuel line clamps are loose or missing (including cracks or damage that may cause potential leakage).**

CHASSIS (Cont'd)

- 196) Under-bus fuel system filter, water separator, or other components are insecurely mounted, cracked or damaged.**
- 197) Any portion of sending unit wiring (including ground) or connections is unsecured or missing insulation.**
- 198) Any wiring is routed subject to excessive heat or abrasion.**
- 199) Drive shaft is bent or seriously dented.**
- 200) Cracks or other damage in the drive shaft, which could cause structural failure.**
- 201) Hardware or fasteners are missing in any U-joint or CV joint assembly.**
- 202) U-joint has significant cross-shaft-to-bearing cup play or CV joint has significant play.**
- 203) U-joint or CV joint shows evidence of significant rusting of bearings.**
- 204) Bearing cup in yoke is loose.**
- 205) Any drive shaft yoke has significant play in splines.**
- 206) If any drive shaft yoke is cracked or damaged.**
- 207) Drive shaft bearing outer race is loose in insulator.**
- 208) Drive shaft inner race is loose on shaft.**
- 209) Significant play in drive shaft hanger bearing.**
- 210) Missing or damaged hardware/fasteners in drive shaft hanger bearing or support assembly.**
- 211) Drive Shaft guard is missing.**
- 212) Drive shaft parking brake lining is broken, cracked or loose.**
- 213) Drive shaft parking brake drum is cracked or has excessive heat damage or scoring of friction surface.**
- 214) Drive shaft parking brake actuating/mounting hardware or fastener is damaged, loose/missing.**
- 215) Park brake is not adjusted per manufacturer's specifications.**
- 216) Any portion of rear axle housing is cracked or bent.**
- 217) Any portion of rear axle housing is leaking lubricant due to cracks, porous metal, or defective weld.**
- 218) Lubricant is excessively low in the differential.**
- 219) Differential pinion yoke has endplay or side play exceeding manufacturer's specifications.**
- 220) Differential pinion/yoke end nut is loose or missing.**
- 221) Any leaf spring is broken or missing.**
- 222) Air bag type spring assembly is damaged/leaking.**
- 223) Air lines or valves are damaged/leaking.**
- 224) Misalignment of spring leaves or other evidence that centering pin is loose or broken.**
- 225) Either rear leaf spring is worn to the point that suspension bottoming has damaged rubber frame bumper.**
- 226) Any rear suspension U-bolt seating plate or shock mount bracket nut is loose missing cracked, or stripped.**
- 227) Any shock is broken or missing.**
- 228) Bushing wear exceeds ¼ inch.**
- 229) Bushing is missing.**
- 230) Spring shackle/hanger is loose, cracked or broken.**
- 231) Spring mount-to-frame fastener is loose, missing, broken or cracked.**
- 232) The frame is cracked at any spring mounting location.**

CHASSIS (Cont'd)

- 233) Spring hanger or bracket is cracked or broken (1/2 inch or more).**
- 234) Any mounting fastener is loose or missing.**
- 235) Spring hanger is worn, pinch bolt is stripped or missing so that spring pin cannot be clamped tightly.**
- 236) Evidence of fresh oil is found on the brake linings or drums/rotors.**
- 237) There is any detectable looseness or roughness in rear wheel bearings.**
- 238) Originally installed body hold-down or cowl mount is missing.**
- 239) Three or more body hold-downs are loose, misaligned or have missing hardware.**
- 240) Three or more body hold-downs have cracks or stripped nuts at floor sill securement point.**
- 241) Holes or cracks in floor sheet metal create an opening to the passenger compartment.**
- 242) Entire cross-section of any floor sill or brace is broken.**
- 243) Any broken weld or mounting of a floor sill/brace resulting in complete separation.**
- 244) K-frame is cracked at the front of the body floor (between step-well and driver's area).**
- 245) The originally installed (as required by manufacturer) outrigger is missing.**
- 246) There are cracks in either frame rail or cross-member.**
- 247) There are any loose, missing rivet or other fastener securing a cross-member to the frame.**
- 248) Missing more than one front cross-member bolt.**
- 249) There is exhaust leakage which is audible or felt around any portion of the exhaust system including manifold, pipe sections or junctions.**
- 250) The muffler is leaking and produces an audible sound.**
- 251) Exhaust is felt from the leaking area (weep hole is excluded).**
- 252) The tailpipe is leaking and produces an audible sound.**
- 253) Exhaust is felt from the leaking area.**
- 254) Exhaust turn-down (1996 or newer if OEM installed) or diffuser missing (diffuser required for 2010 and new engines).**

TIRES

- 255) Tread depth of either front tire is less than 4/32-inch in the most worn groove.**
- 256) Tread depth of any rear tire is less than 2/32-inch in the most worn groove.**
- 257) Recapped tire has been re-grooved.**
- 258) Front tire is a recapped or re-grooved tire.**
- 259) There is evidence that any tire has been re-grooved using unapproved procedure.**
- 260) Any front tire has less than 70 lbs. of air pressure.**
- 261) Any rear tire has less than 50 lbs. of air pressure.**
- 262) Cuts, abrasion, or other damage to tire sidewall resulting in exposed or damaged cord.**
- 263) Separation, bulges (other than normal manufacturer bulge) or other damage within the carcass of the tire.**
- 264) Cracks that run around the bead or sidewall of the tire are present.**
- 265) Retread tire that has any separation of the tire tread from the tire carcass that could result in tire or tread failure.**
- 266) Valve stem is damaged.**
- 267) Damage to the lock ring assembly or lock ring groove of a multi-piece rim, including rust or corrosion which could cause the lock ring not to seat fully.**

268) Cracks or breaks at the lugholes or any other part of a rim or cast spokes.

TIRES (Cont'd)

269) Dents or bends in a rim that could result in failure of a rim or separation of the tire from the rim.

270) Any tire marked for other than highway use is found.

271) Tire is not of the proper type, size and minimum load rating (2000 and newer require "H" range).

272) Any tire on an axle that is not of the same type (e.g., lug or rib), load range or size.

273) Radial and bias ply tires are intermixed on the same axle.

274) Tires/rim are grossly misaligned and affects steering control such that vehicle will not travel in straight line.

275) Improper matching of rims and lock rings.

276) Evidence of slippage of wheel assembly on cast spoke hub.

277) Stud holes are elongated.

278) Any wheel or stud is loose, rusting or corrosion indicating possible looseness.

279) Wheel stud or lug nut is broken or missing.

280) Improper spacer has been installed between dual wheels.

INTERIOR

281) Fire extinguisher rating is less than 2 ½ pound minimum (2002 and newer must have 5 lb. minimum and 10BC rating).

282) No fire extinguisher found on bus.

283) Fire extinguisher pressure gauge indicates re-charge.

284) Fire extinguisher tamper proof seal material cannot be broken.

285) Safety equipment storage box warning buzzer and/or ignition interlock disconnected or malfunctioning.

286) Fire extinguisher is not accessible to driver or not secured in mounting bracket/box.

287) Entire contents of first aid kit are missing or unusable.

288) Entire contents of body fluid clean up kit are missing or unusable.

289) Emergency roadside reflectors are missing.

290) If the starter will engage in any gear other than park or neutral.

291) Transmission shifter will not shift into all available gear positions.

292) Transmission shift indicator indicates wrong gear.

293) Transmission shift detent is non-functional, or if ball or knob (handle) is missing from end of shifter lever.

294) Ignition switch operates without a key.

295) Bus is equipped with a push button or a device other than key type switch.

296) Engine will not crank/start.

297) Ignition switch doesn't function properly in start, run, off or accessory position.

298) Ignition switch is intermittent in any position.

299) Accelerator pedal and assembly are not mounted securely.

300) Accelerator control design and mounting are not of OEM design.

301) Accelerator control and linkage sticks or doesn't operate freely.

302) Accelerator pedal is built-up with extender block or not of OEM design.

303) Engine shutdown malfunction causes engine not to start.

304) Shutdown or operation is difficult.

INTERIOR (Cont'd)

- 305) Bus was originally equipped with ignition switch type controlled shutdown and has been retrofitted with manual type shutdown.**
- 306) Oil or temperature warning system is not functioning or is unreadable.**
- 307) Speedometer doesn't work or is confirmed to be inaccurate.**
- 308) Speedometer is unreadable or damaged.**
- 309) Air pressure gauge is inaccurate, unreadable or not working.**
- 310) High note horn and low note horn fails to function as designed.**
- 311) High coolant temperature warning light or buzzer is inoperative (either constant or momentary).**
- 312) The low oil pressure warning light or buzzer is inoperative (either constant or momentary).**
- 313) Either the air brake warning light or buzzer is non-functioning (either constant or momentary).**
- 314) Any wire or connector is cut or severely chafed.**
- 315) Wire/conductor is exposed or routed against a sharp edge.**
- 316) Any interference with the driver controls.**
- 317) There are open holes or unsealed area in the firewall.**
- 318) There are unsealed holes or cracks through the underside of the bus.**
- 319) Aisle-molding strip is not securely fastened to the floor or aisle.**
- 320) Cover molding presents a sharp edge or protrusion.**
- 321) Any damage to the rubber floor covering which could cause a tripping hazard.**
- 322) Step-well support structure is broken.**
- 323) Step-well is rusted through.**
- 324) Entrance handrail is missing or not securely mounted.**
- 325) Handrail fails the "NHTSA String and Nut Test".**
- 326) Sharp edges or rust-through in interior paneling.**
- 327) Projections from interior paneling that could cause injury to passengers or driver.**
- 328) There are any aerosol cans found in the driver/passenger compartment.**
- 329) Containers with flammable/volatile chemicals are found in the driver/passenger compartment.**
- 330) Any unlabeled container found in the driver/passenger compartment.**
- 331) Objects near handrail/step well area cause failure of NHTSA string & nut test.**
- 332) Seals or weather stripping (dog house cover) allow air/fume leaks into the driver's compartment.**
- 333) Exterior front door lock can be locked from the outside without the use of a key.**
- 334) Either windshield wiper fails to operate.**
- 335) Any portion of heating system within the passenger area creates sharp edges, projections or other hazards to passengers.**
- 336) Defroster system does not function.**
- 337) Driver fan protective cage is missing, loose, or damaged.**
- 338) Emergency door or window will not open properly.**
- 339) Is equipped with any type of a hasp, lock, or any other locking device (except for OEM interlock system).**
- 340) Bus will start with any emergency door locked (OEM interlock system).**
- 341) Latch mechanism will not secure door, hatch, or window in closed position.**
- 342) Emergency exit buzzer circuit fails to operate.**

- 343) Emergency door fails to operate panel buzzer.
- 344) Windshield or side glass is missing.
- 345) Laminated windshield or laminated window glass is broken or splintered that might cause injury when touched.
- 346) Windshield or any window that provides visibility to any mirror is fogged more than two inches in from the outer border.
- 347) Windshield /window fogging or clouding results in reduced visibility of a mirror.
- 348) Tinting on the windshield or windows to the side of the driver does not meet year specific NC School Bus specifications.
- 349) There is any loose, damaged, or protruding window hardware that would be a hazard to passengers.
- 350) Driver view is obstructed by objects or stickers.
- 351) Windshield glass is cracked and could be dislodged.
- 352) Glass is discolored and prevents driver from having clear visibility.
- 353) Any glass is missing.
- 354) Any piece of glass is non-OEM.
- 355) Elevator lift platform is not flush with floor in “up” position.
- 356) Any part of the lift mechanism or hardware is damaged, missing, or not secure including cams, clips, pins, rollers, and platform fasteners.
- 357) Wheelchair lift will not operate as designed.
- 358) Wheelchair or occupant securement straps are broken or frayed.
- 359) Wheelchair tie down track or fasteners are loose or broken.
- 360) Wheelchair/occupant securement track mounted using lag type bolts/sheet metal screws.
- 361) Belt Cutter is missing (Wheel chair equipped vehicles).

MIRRORS

- 362) Driver mirror is missing or cracked.
- 363) Driver mirror will not hold a set adjustment.
- 364) Sun visor is missing.
- 365) Sun visor has sharp/protruding edges that could cause personal injury.
- 366) Exterior mirror is missing.
- 367) Exterior mirror is cracked, pitted, clouded or deteriorated to extent vision is obscured.
- 368) Exterior mirror will not hold set adjustment.
- 369) Mounting of exterior mirror or bracket made by different manufacturers.
- 370) Exterior mirror brackets are severely bent, broken, or mounting is insecure.
- 371) Crossover mirror is missing.
- 372) Crossover mirror is cracked, pitted, clouded or deteriorated to the extent that vision is obscured.
- 373) Mounting of any crossover mirror and bracket made by different manufacturers.

EXTERIOR & BODY

- 374) Headlights go out after being on a short time.
- 375) Headlight operation is intermittent.
- 376) High Beam or Low Beam headlight circuit fails to operate.
- 377) A rear turn signal fails to operate.
- 378) Brake light circuit fails to function.
- 379) Brake pedal is in released and brake light switch sticks or lights stay on.

- 380) Brake light lens is not red or is not proper type meeting SAE specifications.
- 381) Taillight circuit fails to function.
- 382) Tail light lens is not red.
- 383) Taillight lens is not proper type meeting SAE specs.
- 384) Backup lights stay on in any gear position other than reverse.
- 385) Amber or red light does not function or is dim.
- 386) Amber/red lights (both front and rear) do not alternately flash (side to side).
- 387) Warning light is not red (outer) or amber (inner) or is not the proper type.
- 388) Warning light lens is damaged or improper lens installed.
- 389) White light is visible in warning light lenses.
- 390) Warning light lens has darkened, faded, misaimed, or dirty affecting the color of the light or reducing the visibility to less than 500 feet in bright sunlight.
- 391) Warning lights do not function as designed.
- 392) Stop arm light does not operate.
- 393) Stop arm does not flash between 60 and 120 times per minute.
- 394) Stop arm does not operate as designed.
- 395) Bus is not equipped with a student crossing arm assembly and arm.
- 396) Crossing arm does not extend 60 degrees from bumper.
- 397) Crossing arm does not deploy when stop arm is activated.
- 398) Bumper is significantly bent.
- 399) Bumper has protruding metal.
- 400) Bumper-mounting system is cracked or broken.
- 401) Bumper has cracked welds or has missing or loose fasteners.
- 402) Body part damaged/dislocated creating a protrusion or sharp edge.
- 403) Body panels, rivets, or other components are damaged/corroded to the point where joint strength or body structural integrity is compromised.
- 404) Paint is not National School Bus Yellow.
- 405) Warning light hoods and background are not black.
- 406) Reflective markings are missing around any emergency exit or door. (Reflective markings required on 1995 and newer buses).
- 407) "School Bus" and all other required lettering and numbering is missing or damaged on front, rear or sides.
- 408) Emergency door latch mechanism is stuck or requires more than 40 pounds to release.
- 409) Emergency door handle is mounted horizontally to allow "hitching" onto the bus.
- 410) Engine hood cannot be opened as designed.
- 411) Engine hood cannot be secured.
- 412) Engine hood safety latch does not secure hood.
- 413) Engine hood prop rod or hold open feature does not function properly.
- 414) The bus is dirty to the point that visibility through any window or light lens is significantly reduced.

ROAD TEST

- 415) Travel angle is uneven.
- 416) Excessive noise is detected or if engine fails to operate properly.
- 417) Excessive noise and vibration are detected.
- 418) Transmission is slipping.
- 419) Road speed control fails to operate or allows vehicle to exceed 50 MPH.
- 420) Speedometer fails to operate.
- 421) Brake reading is below 60 percent.

APPENDIX B - National Transportation Safety Board Slack Adjusters Warning

"Lessons Learned" is a series of drop-in articles prepared by the NTSB for use in publications of other organizations. An index of articles is available at <http://www.nts.gov/events/journalist/lessons/lessons.htm>
05/2006

Lessons Learned from a Fatal Crash

Truck Air Brake Warning: Manually Adjusting Automatic Slack Adjusters is Dangerous, Can Lead to Deadly Consequences

Safety officials are warning hundreds of thousands of heavy truck operators, drivers, mechanics, and federal and state commercial vehicle inspectors about the dangers of manually adjusting automatic slack adjusters on vehicles equipped with air brakes.

National Transportation Safety Board (NTSB) Acting Chairman Mark V. Rosenker

bluntly warned: "Manually adjusting automatic slack adjusters is dangerous. It should not be done, except during installation or in an emergency to move the vehicle to a repair facility." He emphasized that manual adjustment of this brake component masks the real reason why the brakes are not maintaining adjustment, giving the driver a false sense of security about the effectiveness of the brakes, which will likely go out of adjustment again soon. It also causes abnormal wear to the internal adjusting mechanism for most automatic slack adjusters, which may lead to failure of this brake component.

The warning comes as a result of an NTSB investigation into a fatal runaway dump truck accident in Glen Rock, Pennsylvania, that has shown the deadly consequences of improper maintenance of automatic slack adjusters for air brake systems. In the April 11, 2003, accident, a dump truck was traveling on a steep downgrade when the driver found he was unable to stop the truck. The truck struck four passenger cars, one of which struck three children who were on a nearby sidewalk. A driver and an 11-year-old child from one of the passenger cars were killed.

The NTSB concluded that the mechanics who worked on this truck did not look for underlying problems with the slack adjusters or other brake components. They misdiagnosed the brake problems, probably because they were not properly trained on the function and care of automatic slack adjusters and how they relate to foundation brake systems. Consequently, they repeatedly manually adjusted the automatic slack adjusters, a dangerous practice. The NTSB has seen similar actions from a driver who worked on a truck involved in a similar accident investigated recently in El Cerrito, California.

"The warnings in existing materials available to owners, drivers, mechanics, and inspectors of air-braked vehicles equipped with automatic slack adjusters have not been successful in communicating the inherent dangers of manually adjusting automatic slack adjusters to correct out-of-adjustment brakes," the NTSB said.

Even organizations that specialize in truck maintenance and repair often give out wrong or inadequate information on automatic slack adjusters. During the probe into the Pennsylvania accident, investigators found that several

private study guides of the ASE's truck brake test inadequately cover the maintenance of automatic slack adjuster-equipped brakes, and some contain incorrect information. NTSB said one study guide wrongly states, "Automatic slack adjusters may require periodic adjustment." The NTSB is concerned because many mechanics use the study guides as a source of general maintenance information as well as for test preparation. "It is imperative that these guides contain thorough and accurate information about automatic slack adjusters," said Rosenker.

The NTSB said many truck operators, who do not consider themselves motor carriers and have very little or no interaction with safety regulators or trucking organizations and associations, must be alerted to the problem. These vehicles are used by a diverse cross-section of operators, including fire departments, landscaping companies, school bus operators, general contractors, and even vacationers who have large recreational vehicles.

In addition, the NTSB investigation found that lack of knowledge and skills in operating air-braked vehicles played a role in the accident. The 21-year-old driver of the dump truck had been on the job for less than two weeks and had never driven an air brake-equipped vehicle before joining the company. He received no training on how to drive an air brake-equipped vehicle—an important failure because air brakes on trucks operate differently from hydraulic brakes on passenger cars. The rear brakes on the truck were out of adjustment and provided little or no braking force. The driver pumped the brakes, reducing the capability of the front brakes and exacerbating the loss of braking capability in the out-of-adjustment rear brakes. Until recent widespread use of antilock brake systems (ABS) brakes, drivers of hydraulically braked vehicles (passenger cars, SUVs, pickups and other light-duty trucks) were taught to pump their brakes in emergencies. But in an air-braked vehicle, pumping the brakes depletes the air pressure, thereby drastically reducing the brakes' capability.

The NTSB estimates there are in excess of 8 million vehicles on the road equipped with automatic slack adjusters as every large truck built since 1994 has been required to have them. Many of these vehicles may be operated by drivers who have no air brake training and may not be able to operate their vehicles safely. "This situation needs to change, and change quickly," said the acting NTSB chairman.

The NTSB found that the probable cause of the accident was the lack of oversight by the vehicle's owner, which had resulted in an untrained driver improperly operating an overloaded, air brake-equipped vehicle with inadequately maintained brakes. Contributing to the accident was the misdiagnosis of the vehicle's underlying brake problems by mechanics involved with the vehicle's maintenance. Also contributing was a lack of readily available and accurate information about automatic slack adjusters and inadequate warnings about safety problems caused by manually adjusting them.

The NTSB issued a series of safety recommendations to address training or regulations concerning air brake-equipped vehicles, to the Federal Motor Carrier Safety Administration, State governments, the Commercial Vehicle Safety Alliance, automatic slack adjuster manufacturers, manufacturers of vehicles equipped with air brakes, the National Institute for Automotive Service Excellence, and several publishers of study guides.

A full accident report may be found on the Board's Web site, www.nts.gov, under Publications, Highway.

APPENDIX C – State Laws and Policies

PUBLIC SCHOOL LAW G.S. 115C-248 and 115C-317

§ 115C-248. Inspection of school buses and activity buses; report of defects by drivers; discontinuing use until defects remedied.

- (a) The superintendent of each local school administrative unit, shall cause each school bus owned or operated by such local school administrative unit to be inspected at least once each 30 days during the school year for mechanical defects, or other defects which may affect the safe operation of such bus. A report of such inspection, together with the recommendations of the person making the inspection, shall be filed promptly in the office of the superintendent of such local school administrative unit, and a copy thereof shall be forwarded to the principal of the school to which such bus is assigned.
- (b) It shall be the duty of the driver of each school bus to report promptly to the principal of the school, to which such bus is assigned, any mechanical defect or other defect which may affect the safe operation of the bus when such defect comes to the attention of the driver, and the principal shall thereupon report such defect to the superintendent of the local school administrative unit. It shall be the duty of the superintendent of the local school administrative unit to cause any and all such defects to be corrected promptly.
- (c) If any school bus is found by the principal of the school, to which it is assigned, or by the superintendent of the local school administrative unit, to be so defective that the bus may not be operated with reasonable safety, it shall be the duty of such principal or superintendent to cause the use of such bus to be discontinued until such defect is remedied, in which event the principal of the school, to which such bus is assigned, may permit the use of a different bus assigned to such school in the transportation of the pupils and employees assigned to the bus found to be defective.
- (d) The superintendent of each local school administrative unit, shall cause each activity bus which is used for the transportation of students by such local school administrative unit or any public school system therein to be inspected for mechanical defects, or other defects which may affect the safe operation of such activity bus, at the same time and in the same way and manner as the regular public school buses for the normal transportation of public school pupils are inspected. A report of such inspection, together with the recommendations of the person making the inspection, shall be filed with the principal of the school which uses and operates such activity bus and a copy shall be forwarded to the superintendent of the local school administrative unit involved. It shall be the duty of the driver of each activity bus to make the same reports to the principal of the school using and operating such activity bus as is required by this section. If any public school activity bus is found to be so defective that the activity bus may not be operated with reasonable safety, it shall be the duty of such principal to cause the use of such activity bus to be discontinued until such defect is remedied to the satisfaction of the person making the inspection and a report to this effect has been filed in the manner herein prescribed. Nothing in this subsection shall authorize the use of State funds for the purchase, operation or repair of any activity bus. (1955, c. 1372, art. 21, s. 8; 1961, c. 474; 1975, c. 150, s. 2; 1981, c. 423, s. 1.)

§ 115C-317. Penalty for making false reports or records.

Any school employee of the public schools other than a superintendent, principal, or teacher, who knowingly and willfully makes or procures another to make any false report or records, requisitions, or payrolls, respecting daily attendance of pupils in the public schools, payroll data sheets, or other reports required to be made to any board or officer in the performance of his duties, shall be guilty of a Class 1 misdemeanor and the certificate of such person to teach in the public schools of North Carolina shall be revoked by the Superintendent of Public Instruction. (1955, c. 1372, art. 17, s. 6; 1959, c. 1294; 1981, c. 423, s. 1; 1993, c. 539, s. 885; 1994, Ex. Sess., c. 24, s. 14(c).)

North Carolina State Board of Education – Policy Manual

Priority: Twenty-First Century Systems

Category: Transportation Policy ID Number: TCS-H-011 Current Policy Date: 04/01/2010

Policy Title: Policies governing School Bus and Activity Bus Inspections

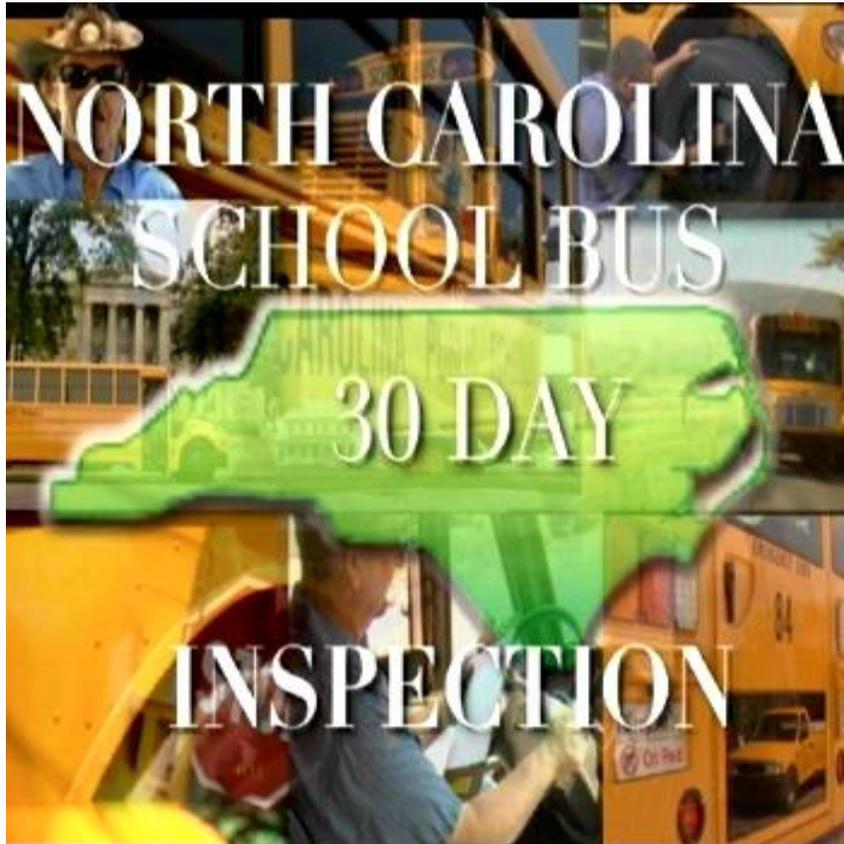
LEAs shall require each 30-day inspection required under G.S. 115C-248 to be conducted by an individual who has completed the training and certification requirements administered by the Department of Public Instruction.

Effective date: August 1, 2011

APPENDIX D

30 Day Inspection Video

An instructional video produced in 2010 was provided to each school bus garage in North Carolina as an educational tool for new technicians and a refresher for others performing 30 day inspections.



APPENDIX E

Sample Printed 30 Day Inspection Form

11/29/2010 DP02 DPI Preventive Maintenance Order
16:03:42

Original Page 1 of 1

ORDER # 62002088593	PLANT Jackson County	ASSIGN BRYAN BROOKS
EQ/INV.# 6050-0015	SAP EQ.# 62126123	METER READING 71313.0 MI
EQ. DESC. 66 LIFT INTERNATIONAL VT365E		PM DUE AT
YEAR 2006	MAKE INTERNATIONAL	MODEL PB105
PLANNED DATE 12/28/2010	LIC PLATE 64253S	VIN # 4DRBUAFN56B156565

WORK DESCRIPTION

6050-0015: Bus 30-Day

OPERATION	DESCRIPTION	TIME	VMRS CODE
0010	Check Brakes and Slack Adjusters (006)		013-001-000
Check Brakes and Slack Adjusters (006) Brake Stroke Measurement: LF__ RF__ LR__ RR__			

← Coolant test every 90 days

OPERATION	DESCRIPTION	TIME	VMRS CODE
0020	Test Coolant Condition with Strips (006)		053-999-105
Test Coolant Condition with Strips (006) - Use Coolant Mfr's apprvd strip. SCA/PH: __			

OPERATION	DESCRIPTION	TIME	VMRS CODE
0030	Perform 30 day Safety Inspection		
Perform 30 day Safety Inspection DATE _____ MILEAGE _____			
OK	ITEM INSPECTED	NEEDS REP.	OK
(1)	Ent.steps/Handrails	___	(24)
(2)	Door controls(all)	___	(25)
(3)	Horn/Sun Visor	___	(26)
(4)	Warning buzzers(all)	___	(27)
(5)	Mirrors (all)	___	(28)
(6)	Turn signals/cancel	___	(29)
(7)	Dash instruments (all)	___	(30)
(8)	Fire ext / Belt Cutter	___	(31)
(9)	Body fluid/Firstaid kit	___	(32)
(10)	Lights (all)	___	(33)
(11)	Child reminder System	___	(34)
(12)	WS Wipers (arm travel)	___	(35)
	Washer fluid added	___	(36)
(13)	Clean:int. ___ ext. ___	___	LRO__ LRI__ RRO__ RRI__
(14)	Heater/AC filter clean	___	(37)
(15)	Heater/Defroster/A/C	___	LRO__ LRI__ RRO__ RRI__
(16)	Seats:all Covers/Foam/Frames (seat cushions secure?)	___	(38)
(17)	Seat belts(all)	___	(39)
(18)	Bus body glass (all)	___	(40)
(19)	Brake,foot(check/adj)	___	(41)
(20)	Brake,park(check/adj)	___	(42)
(21)	Engine:oil added ___qt.	___	(43)
(22)	Trans:fluid added ___qt.	___	(44)
(23)	Coolant Frz Pt. ___	___	(45)
SIGN BELOW: INSPECTOR SUPERVISOR/DATE REMARKS:			