WEST VIRGINIA
SECRETARY OF STATE
NATALIE E. TENNANT
ADMINISTRATIVE LAW DIVISION

Form #2

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OFFICE OF WEST VIRGINIA
SECRETARY OF STATE

NOTICE OF A COMMENT PERIOD ON A PROPOSED RULE

AGENCY: West Virginia State Police TITLE NUMBER: 81

RULE TYPE: Legislative CITE AUTHORITY: W. Va. Code §17C-15-48(i)

AMENDMENT TO AN EXISTING RULE: YES X NO ____

IF YES, SERIES NUMBER OF RULE BEING AMENDED: Series 4

TITLE OF RULE BEING AMENDED: West Virginia State Police Modified Vehicle Inspection Manual

IF NO, SERIES NUMBER OF RULE BEING PROPOSED: ____

TITLE OF RULE BEING PROPOSED: ____

IN LIEU OF A PUBLIC HEARING, A COMMENT PERIOD HAS BEEN ESTABLISHED DURING WHICH ANY INTERESTED PERSON MAY SEND COMMENTS CONCERNING THESE PROPOSED RULES. THIS COMMENT PERIOD WILL END ON July 18, 2011 AT 12:00 p.m. ONLY WRITTEN COMMENTS WILL BE ACCEPTED AND ARE TO BE MAILED TO THE FOLLOWING ADDRESS:

Sgt. G. E. Dornburg
West Virginia State Police
725 Jefferson Road
South Charleston, WV 25309

THE ISSUES TO BE HEARD SHALL BE LIMITED TO THIS PROPOSED RULE.

Authorized Signature

ATTACH A **BRIEF** SUMMARY OF YOUR PROPOSAL

TITLE 81
LEGISLATIVE RULE
WEST VIRGINIA STATE POLICE

SERIES 4
MODIFIED VEHICLE INSPECTION

Statement of Circumstances

General Requirements – Subsection 4.2.1.

The proposed change would cause any vehicle that has been altered in height from the original manufacturer's specification with the exceptions allowed in the code to fall into the Modified Vehicle Inspection Program. This would help clarify and enforce the requirements of 17C-15-48 and place vehicles which have been purposely lowered into the Modified Inspection Program.

General Requirements – Subsection 4.2.2.3.3.

The proposed change would allow a station to have only one Modified Inspection Mechanic, which could be the owner. Currently, if the Owner is a Modified Inspector, they must employee at least one other Modified Inspector Mechanic. This allows smaller garages to be a Modified Inspection Station.

General Requirements – Subsection 4.2.5.

The proposed change would change the word "standard" to "regular" to clarify the sentence. This is to ensure that the vehicle being inspected receives both a Modified Inspection under 17C-15-48 and a Regular Inspection under the provisions of Chapter 17C, Section 16, Inspection of Vehicles.

General Requirements – Subsection 4.2.7.

The proposed change would clarify how to affix the Modified Inspection Sticker emblem. Due to the change in the type of emblem being used to show the vehicle has been Inspected we no longer "punch" the emblem, but use inserts to show the month and year of expiration.

General Requirements – Subsection 4.2.9.

The proposed change would clarify how the emblems are ordered from the Traffic Records Section. The Traffic Record Section has changed the previously type of forms to order the emblems to one standard form which can be used to order any type of emblem used in the Inspection Program, thus reducing paperwork.

Modified Vehicle Inspection Requirements, Suspension Systems – Subsection 4.6.2

The proposed change would allow the use of spacers on the front end suspension to level a vehicle. Currently "Blocks" can not be used on the front end of the suspension to raise the

vehicle. Allowing spacers to be used, which do not affect the performance of the suspension and steering, allows the vehicles front height and rear height to be more level.

These sections and subsections have strike throughs.

TITLE 81
LEGISLATIVE RULE
WEST VIRGINIA STATE POLICE

SERIES 4
MODIFIED VEHICLE INSPECTION

Summary of Proposal

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Modified Vehicle Inspection Requirements, Suspension Systems – Subsection 4.6.2

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These sections and subsections have strike throughs.

APPENDIX B

FISCAL NOTE FOR PROPOSED RULES

Rule Title: West Virginia State Police Modified Vehicle Inspection Manual

Type of Rule: [X] Legislative [ ] Interpretive [ ] Procedural

Agency: West Virginia State Police

Address: 725 Jefferson Road

South Charelston, WV 25309

Phone Number: 304-746-2490 Email: jdornburg@wvsp.state.wv.us

Fiscal Note Summary

Summarize in a clear and concise manner what impact this measure will have on costs and revenues of state government.

This measure will not have an impact on costs and revenues of state government.

Fiscal Note Detail

Show over-all effect in Item 1 and 2 and, in Item 3, give an explanation of Breakdown by fiscal year, including long-range effect.

FISCAL YEAR			
Effect of Proposal	Current Increase/Decrease (use "-")	Next Increase/Decrease (use "-")	Fiscal Year (Upon Full Implementation)
1. Estimated Total Cost			
Personal Services			
Current Expenses			
Repairs & Alterations			
Assets			
Other			
2. Estimated Total Revenues			

Rule Title: _____

Rule Title: West Virginia State Police Modified Vehicle Inspection Manual

3. **Explanation of above estimates (including long-range effect):**
Please include any increase or decrease in fees in your estimated total revenues.

Not applicable

MEMORANDUM

Please identify any areas of vagueness, technical defects, reasons the proposed rule **would not** have a fiscal impact, and/or any special issues **not** captured elsewhere on this form.

Date: _____

Signature of Agency Head or Authorized Representative

Colonel C. "Jay" Smithers

QUESTIONNAIRE

(Please include a copy of this form with each filing of your rule: Notice of Public Hearing or Comment Period; Proposed Rule, and if needed, Emergency and Modified Rule.)

DATE: _____

TO: LEGISLATIVE RULE-MAKING REVIEW COMMITTEE

FROM:(*Agency Name, Address & Phone No.*) West Virginia State Police
725 Jefferson Road
South Charleston, WV 25309

LEGISLATIVE RULE TITLE: West Virginia State Police Modified Vehicle Inspection

1. Authorizing statute(s) citation

W. Va. Code §17C-15-48(i)

2. a. Date filed in State Register with Notice of Hearing or Public Comment Period:

b. What other notice, including advertising, did you give of the hearing?

c. Date of Public Hearing(s) ***or*** Public Comment Period ended:

d. Attach list of persons who appeared at hearing, comments received, amendments, reasons for amendments.

Attached _____ No comments received _____

e. Date you filed in State Register the agency approved proposed Legislative Rule following public hearing: (be exact)

f. **Name, title, address and <u>phone/fax/e-mail numbers</u>** of agency person(s) to receive all *written correspondence* regarding this rule: (Please type)

Colonel C.R. "Jay" Smithers
Superintendent
West Virginia State Police
725 Jefferson Road
South Charleston, WV 25309

(P) 304-746-2115
(F) 304-746-2246 E-mail - jsmithers@wvsp.state.wv.us

g. **<u>IF DIFFERENT</u> FROM ITEM 'f'**, please give **Name, title, address and phone number(s)** of agency person(s) who wrote and/or has responsibility for the contents of this rule: (Please type)

Sgt. G. E. Dornburg
West Virginia State Police
725 Jefferson Road
South Charleston, WV 25309

(P) 304-746-2490
(F) 304-746-2245 E-mail - jdornburg@wvsp.state.wv.us

3. If the statute under which you promulgated the submitted rules requires certain findings and determinations to be made as a condition precedent to their promulgation:

a. Give the date upon which you filed in the State Register a notice of the time and place of a hearing for the taking of evidence and a general description of the issues to be decided.

N/A

b. Date of hearing or comment period:

_____

c. On what date did you file in the State Register the findings and determinations required together with the reasons therefor?

_____

d. Attach findings and determinations and reasons:

Attached _____

TITLE 81
LEGISLATIVE RULE
WEST VIRGINIA STATE POLICE

SERIES 4
MODIFIED VEHICLE INSPECTIONS

'81-4-1. General.

1.1. Scope. -- This rule governs and specifies the inspection procedures for vehicles with modified suspension systems.

1.2. Authority. -- W. Va. Code '17C-15-48(i).

1.3. Filing Date. ~~--May 21, 1998~~.

1.4. Effective Date. -- ~~June 15, 1998~~.

'81-4-2. General Requirements.

2.1. Any vehicle operated upon a public highway with a gross vehicle weight rating of less than 10,000 pounds which has been ~~raised~~ altered from the original manufacturer's specifications or configuration by the installation of a suspension lift kit, body lift kit, or tires which are three (3) sizes or more above the maximum size recommended by the manufacturer must undergo a modified vehicle inspection.

2.2. Upon the submission of a completed application, the Superintendent of the West Virginia State Police may grant certified inspection stations the authority to perform modified vehicle inspection in accordance with this section 2.2.

2.2.1. To the extent that at least two (2) qualified applicants are available, each county shall have a minimum of two (2) modified vehicle inspection stations.

2.2.2. To the extent that at least a minimum number of qualified applicants are available, each county shall have one (1) modified vehicle inspection state for every four thousand (4,000) registered vehicles within that county.

2.2.2.1. The Superintendent first shall allocate the number of modified vehicle inspection stations based upon the geographic location of the certified inspection stations submitting applications to ensure accessibility of modified vehicle inspection stations throughout a county.

2.2.2.2. If the number of qualified applicants exceeds the number of modified vehicle stations allotted to a particular county, the Superintendent shall grant authority to perform modified vehicle inspections first based upon geographic location to ensure accessibility of modified vehicle inspection stations throughout the county. The remainder of qualified applicants will be randomly selected by the Superintendent or his/her designee.

2.2.3. In order to be qualified to be a modified vehicle inspection station, a certified inspection station must continue to meet the following minimum standards:

2.2.3.1. The certified inspection station must have been a certified inspection station for the three (3) consecutive years immediately preceding the submission of the application.

2.2.3.2. The certified inspection station must not have been suspended by the West Virginia State Police from performing inspections for the three (3) consecutive years immediately preceding the submission of the application.

2.2.3.3. The certified inspection station must have one (1) licensed inspector mechanic ~~other than the owner of the station.~~

2.2.3.4. The certified inspection station must be at least a certified one-car inspection station.

2.2.3.5. Each licensed inspector mechanic who will be performing modified vehicle inspections must have a minimum of three (3) years experience as an inspector mechanic and may not have been suspended by the West Virginia State Police.

2.2.4. The Superintendent may certify additional modified vehicle inspection stations to operate in any particular county if the Superintendent determines that the number of modified vehicle inspection stations in a particular county is insufficient to meet the demand for modified vehicle inspections.

2.2.5. For purposes of this section 2.2, a completed application shall consist of a signed application for demonstrating the criteria contained in section 2.2.3 of this rule. Application forms will be prescribed by the Superintendent.

2.3. Inspector mechanics will follow the same preliminary guidelines in the inspecting of modified vehicles, i.e., proof of insurance and ownership, etc.

2.4. Upon examination of the insurance card and ownership forms, the standard modified vehicle inspection certificate will be removed.

2.5. The inspector mechanic will then conduct a ~~standard~~ regular state inspection and also inspect those areas as outlined in the Modified Vehicle Inspection Requirements.

2.5.1. If the vehicle fails to pass either the regular vehicle inspection or the modified vehicle inspection requirements, the inspector mechanic will place a rejection sticker on the vehicle in accordance with the already prescribed standards.

2.5.2. If the vehicle passes all requirements, a modified vehicle inspection emblem will be placed on the vehicle.

2.6. The modified vehicle inspection emblem will be the only inspection emblem required on these vehicles.

2.7. These emblems will be completed on the back by the inspector mechanic, ~~the appropriate date punched~~ with the appropriate inserts applied and placed in the lower left (driver's side) corner of the windshield, much the same as the original inspection certificate.

2.8. All inspections will be logged on a modified vehicle inspection record.

2.8.1. Upon completion of the modified vehicle inspection record, the original and all copies will be handled the same as with the standard inspection forms.

2.9. Modified vehicle inspection emblems will be requisitioned from the West Virginia State Police, Traffic Records Section, ~~725 Jefferson Road, South Charleston, West Virginia 25309~~, as per established rules and regulations on the appropriate requisition form ~~(DPS-MVI-4B)~~.

2.10. Charges for the modified vehicle inspection shall be in accordance with those specified in W. Va. Code ' 17C-15-48, as amended.

2.11. Where these rules are silent, inspectors are directed to refer back to the provisions of the West Virginia State Police Inspection Manual for standard vehicle inspection.

'81-4-3. Modified Vehicle Inspection Definitions.

3.1. Constant Velocity or C. V. Joint -- On front wheel drive vehicles, the part of the drive axle shaft which allows for the application of torque and the turning of the wheels simultaneously.

3.2. F.M.V.S.S. -- Federal Motor Vehicle Safety Standard.

3.3. Modified Vehicle -- A vehicle which has been raised or lowered in altitude from the manufacturer's original height.

3.4. "OEM" -- Original Equipment Manufacturer. A part or component of the vehicle which is identical to the part or component on the original vehicle and is supplied by the recognized manufacturer of the original vehicle.

3.5. "OER" -- Original Equipment Replacement. A vehicle part or component which performs the identical function as the part or component of the original vehicle but is supplied by a manufacturer other than the recognized manufacturer of the original vehicle.

3.6. "OREP" -- Original Replacement Essential Part means any part or component of a vehicle which is:

3.6.1. Identical in fact or in performance to any part or component offered as an option for that vehicle by the original manufacturer of the vehicle when new;

3.6.2. Essential for the safe operation of the vehicle; and

3.6.3. Purchasable through auto parts store or dealerships of the original vehicle manufacturer.

Examples include, but are not limited to, parts and components of a vehicle's engine, transmission, differential, steering system, suspension system, exhaust system, intake system, body parts or lamps and reflectors. A part or component which may alter the performance of a vehicle or may inherently affect adversely the safety or structural integrity of a vehicle, its occupants, or surrounding vehicles or individuals, unless specifically excepted in these rules, shall not be an original replacement essential part.

3.7. Recognized Motor Vehicle Manufacturer -- A person engaged in the business of manufacturing or assembling motor vehicles who has filed an identification statement with the U.S. Department of Transportation and is applying certification tags to the vehicles being manufactured in accordance with Part 567 or Title 49, The Code of Federal Regulations.

3.8. SAE -- Society of Automotive Engineers.

3.9. Shock Absorber -- A Generic Term which is commonly applied to hydraulic or pneumatic mechanisms used for the purpose of damping or suppressing oscillatory motion of vehicle bodies.

3.10. Split Service Brake System -- A brake system consisting of two (2) or more sub-systems actuated by a single control design so that a leakage-type failure of a pressure component in a single sub-system (except structural failure of a housing that is common to two (2) or more sub-systems) shall not impair the operations of any other sub-system.

3.11. Steering System -- The assembly of mechanical, structural, pneumatic or hydraulic components which allow for movement of the vehicle to the right or left.

3.12. Suspension System -- That assembly of mechanical, structural, pneumatic or hydraulic members which provides a flexible support between the ground or roadway and the engine, load and passenger carrying structure of the vehicle.

3.13. Wheel Base -- The distance in inches from the center of the front wheel to the center of the rear wheel as measured in a straight line from the front to rear wheel of the same side of the vehicle. Whenever referred to within these regulations, wheel base will be the original manufacturer's specifications with no modification.

3.14. Wheel Track -- The distance in inches from the center of the tire of one axle to the center of the opposite tire of the same axle as measured in a straight line across the vehicle. Whenever referred to within these regulations, wheel track will be the original manufacturer's specification with no modification.

'81-4-4. Modified Vehicle Inspection Requirements.

4.1. Fuel System (combustion power units only).

4.1.1. Each fuel system orifice provided for the introduction of air to be used for the combustion of fuel (air intake) shall be equipped with a device which will:

4.1.1.1. Prevent the ejection into the atmosphere of any ignited fuel/air mixture.

4.1.2. All fuel system components, such as tank, tubing, hoses, clamps, etc., shall:

4.1.2.1. Be located outside of any compartment intended for use by the driver or any passenger (except OEM or OREP components).

4.1.2.2. Be securely attached with fasteners designed for this purpose.

4.1.2.3. Not be positioned above, or nearer than three (3) inches to any exhaust system component, except in the engine compartment, unless appropriate shielding is provided (except OEM or OREP components).

4.1.2.4. Be positioned so as not to contact any moving vehicle component.

4.1.2.5. Be free of any fuel leakage.

4.1.3. Fuel line connection to the engine shall be of a flexible design, and of a length sufficient to accommodate all engine vibrations and movements of the engine with respect to the vehicle frame.

4.1.4. The fuel tank shall:

4.1.4.1. Not be located in the engine compartment (except OEM or OREP components).

4.1.4.2. Be shielded from any compartment intended for use by a flame-proof barrier (except OEM or OREP components).

4.1.4.3. Be securely mounted to the body or frame.

4.1.4.4. Comply with VESC-12 (minimum standard for fuel tanks) if not built by a recognized motor vehicle manufacturer.

4.1.4.5. Be equipped with an external vent or be vented to the engine through an evaporative emission control system (EEC).

4.1.2.6. Be equipped with a filler cap designed to vent fuel spillage from the filler opening when the cap is in place.

4.1.2.7. Be located within the lateral perimeter of the vehicle frame or unit body to minimize crash damage rupturing (unless originally equipped).

4.1.5. Auxiliary liquid fuel tanks described as an additional fuel tank and any other components attached directly thereto designed to supplement the vehicle's liquid fuel carrying capacity beyond that provided by the vehicle manufacturer shall meet the requirements of VESC-12.

4.2. Vehicle Body.

4.2.1. Body Structure -- The body structure of a modified vehicle shall be free of sharp edges and projections in all interior and exterior locations where they may be contacted by persons in the normal use and care of the vehicle. This requirement does not include those locations usually accessible only when the vehicle is hoisted or partially dismantled for the purpose of maintenance or repair.

4.2.1.1. The body to frame mounting hardware shall be in accordance with OEM specifications, provided that a maximum three (3) inch spacer block may be added, over and above the manufacturer's spacer block and further provided that appropriate modifications of the steering column, brake hose location, and controls are made when required.

4.2.2. Doors and Latches.

4.2.2.1. A modified vehicle shall be provided with a means of entry and exit on each side of the vehicle which provide ready access to the seats in the vehicle by vehicle occupants.

4.2.2.2. On vehicles not equipped with doors, approved type occupant restraining devices shall be installed within the vehicle and be readily accessible to the occupants.

4.2.2.3. The doors used to provide access to the passenger compartment of a modified vehicle shall be of a hinged type and shall be readily operable and be provided with a two-position self-acting latch which functions in each latching position to keep the door from opening (unless OEM). This requirement does not apply to doors that are designed to be easily attached to or removed from modified vehicles designed for operation without doors.

4.2.2.4. All doors shall be equipped with a manual latch control on the exterior of the door and a manual or electric latch on the interior of the door.

4.2.3. Hood and Trunk Latches.

4.2.3.1. Hood -- All modified vehicles are required to have a hood which shall cover the top of entire engine compartment. The engine compartment sides may remain open.

4.2.3.2. A hood, a trunk lid, or any compartment cover forward of the windshield, which opens along the edge toward the front of a modified vehicle shall be equipped with a two-position self-acting latch which functions in each latching position to keep the hood, lid, or cover closed. A minimum of two (2) hood pins designed for that purpose can be substituted for the two-position self-acting latch.

4.2.3.3. A hood, trunk lid, or compartment cover which opens along an edge toward the sides or the rear of a modified vehicle shall be equipped with at least one (1) latch which holds the hood, lid or cover in the closed position.

4.2.4. Fenders -- Each tire of a modified vehicle which contacts the surface of the road shall be equipped with a fender, or other body structure, which covers the entire width of the tire above that portion of the circumference from 15° in front to 75° to the rear of the vertical line through the center of the wheel hub (see attached Appendix A).

4.2.4.1. Any attachment added to the body or fender of the vehicle to meet the requirements of this section (i.e. mud flaps, fender flares) shall be securely mounted and free of any sharp edges or protuberances.

4.2.5. Driver Visibility -- Obstructions forward of the windshield can extend no more than three (3) inches upward into the horizontally projected vision area of the windshield except for windshield wiper components.

4.3. Vehicle Frame.

4.3.1. Frame -- A modified vehicle shall be equipped with a frame consisting of structural beams or channels, or structural tubing, or unitized construction capable of supporting the vehicle, its load, and the torque produced by the power source under all conditions of operation. The frame structure shall be essentially rigid, free of cracks and visual indications of weakness, such as bending, buckling or poor

quality welded joints.

4.3.2. Floor Pan -- A modified vehicle shall be equipped with a floor pan which:

4.3.2.1. Covers the area beneath the passenger compartment and any cargo (luggage) compartment that is not entirely separate from the passenger compartment. (Entirely separate means there are no components shared by both compartments, such as roof, floor, or sides).

4.3.2.2. Is capable of supporting the weight of the number of occupants, including seats and any cargo the vehicle is designed to carry.

4.3.2.3. Has sufficient strength to adequately anchor the seats and safety belts.

4.3.2.4. Is free of openings which are not sealed or provided with covers which are specifically designed to prevent the transit of fumes and airborne particles.

4.3.3. Bumpers -- A modified vehicle shall be equipped with a bumper on the front. A rear bumper must be present if the vehicle was so equipped by the manufacturer. OEM or OREP bumpers are acceptable.

Rear bumpers are required on any modified motor vehicle if the fuel tank is located in the rear and is unprotected by the frame of the vehicle.

Whenever the bumpers installed on a modified vehicle are altered, modified, replaced, or whenever the vehicle ground clearance height has been altered or modified, the bumpers installed on the vehicle shall:

4.3.3.1. Be of sturdy construction.

4.3.3.2. Be securely attached to the vehicle frame with attaching components specifically designed for the purpose which are equivalent in strength to the bumper.

4.3.3.3. Have no pointed projections or sharp edges.

4.3.3.4. Have a smooth outward face.

4.3.3.5. Be at least three (3) inches in vertical height, be centered on the vehicle center line and extend horizontally no less than the wheel track distance.

4.3.3.6. Not be constructed of pipe unless OEM.

4.3.3.7. Be mounted no higher than specified from the ground to the bottom of the bumper. Maximum bumper heights shall be indicated below:

4.3.3.7.1. Vehicles 10,000 pounds or less: Maximum height to both front and rear bumper is thirty-one (31) inches as measured from the ground to the bottom of the bumper. No person may alter, modify, or otherwise move the original bumper mounting on the frame. In the absence of bumpers, or if the original bumper has been moved, bumper heights will be measured to the frame rail.

4.3.3.7.2. All above measurements will be made with all tires on the vehicle inflated to the tire manufacturer's specifications.

4.4. Brake System.

4.4.1. Every modified vehicle shall be equipped with a service brake system which:

4.4.1.1. Will provide braking action at each wheel.

4.4.1.2. Is actuated by pressure applied to a pedal control by the driver's foot.

4.4.1.3. Is actuated primarily by the use of hydraulic fluid (actuation primarily by mechanical means, rods, or cables, is not permitted even if the OEM system was so designed).

4.4.2. Modified vehicles shall be equipped with a service brake system which:

4.4.2.1. Is designed to prevent the complete loss of the braking function in the event of a rupture or leakage-type failure of any single pressure component except structural failures of the master cylinder (split system required).

4.4.2.2. Is equipped with a combination of components, i.e., master cylinders, calipers, wheel cylinders, metering valves, proportioning valves, etc., which is in accordance with current accepted automotive industry standards.

4.4.3. Brake tubing and brake hose installed on a modified vehicle shall be:

4.4.3.1. Securely attached with hardware designed for this purpose in a manner which will prevent chafing, kinking, or other mechanical damage.

4.4.3.2. Of sufficient length and flexibility to accommodate, without damage, all normal movements of the parts to which it is attached.

4.4.3.3. Located in a manner that prevents contact with any component of the vehicle's exhaust system.

4.4.3.4. Routed along the exterior of box or tubular frame chassis. (Routing tubing or hoses through the interior or along bottom edge of such frame or tubing is prohibited, unless OEM).

4.4.4. All tubing, other than OEM, used in the brake service brake system of a modified vehicle shall be of a type that meets the requirements of SAE Standard J1047, Tubing - Motor Vehicle Brake System, Hydraulic. No tubing shall be made of copper.

4.4.5. All brake tubing ends must be double flared in a manner consistent with SAE Standard J533b or formed in accordance with SAE recommended practice J1290.

4.4.6. All hoses, other than OEM, used in the service brake system of a modified vehicle shall be of a type that meets the requirements of FMVSS-106.

4.4.7. Every modified vehicle shall be equipped with a parking brake system which:

4.4.7.1. Provides braking action on at least two wheels of the same axle.

4.4.7.2. Is actuated by a control that is operated by the driver's hands or foot and remains set in the applied position until released by a separate action.

4.4.7.3. Is actuated by a means independent of the service brake system except that the brake shoes and drums, or pads and discs, may be common to both the service and parking brake systems.

4.5. Steering System.

4.5.1. The steering control mechanism of a modified vehicle shall:

4.5.1.1. Consist of a circular steering wheel having an outside diameter of no less than thirteen (13) inches attached to a shaft in a manner such that the rotary motion of the control device turns the shaft which will cause the moving vehicle to move to the right when the control is rotated in a clockwise direction and to the left when the control is rotated in a counterclockwise direction.

4.5.1.2. Be securely attached to a structural member of the vehicle.

4.5.1.3. Be located forward of the driver's seating position.

4.5.1.4. Be operable through its entire control range by a person seated against the seat back at the driver's position.

4.5.1.5. Not interfere with the driver's vision through the windshield nor interfere with any other vehicle control mechanism.

4.5.1.6. Be so constructed that no components or attachments, including horn actuating mechanism and trim hardware can catch the driver's clothing or jewelry during normal driving maneuvers.

4.5.1.7. Have no other component or structure between the driver and the device except safety belts and/or air bags.

4.5.1.8. Have no other component or structure located in the plane of rotation nearer than three (3) inches outside of the path of the maximum radius of the control device (unless OEM).

4.5.1.9. Have a range of rotation (lock to lock) of no less than two (2) turns (360° rotation per turn) and no more than 6 turns and shall be free of any jamming or binding throughout this range. From a straight ahead position, the number of turns to the right stop shall be equal to the number of turns to the left stop. One quarter turn tolerance permitted.

4.5.2. A modified vehicle equipped with a steering system that has been modified in any manner except replacement of the steering wheel shall:

4.5.2.1. Have the steering components geometrically arranged in accordance with the manufacturer's specifications.

4.5.2.2. Comply with the original vehicle manufacturer's caster, camber and toe-in alignment specifications.

4.5.2.3. Have all nuts equipped with appropriate locking devices such as lock washers, cotter pins or self-locking devices. If self-locking nuts are used, at least one complete bolt thread must pass through the nut and be exposed.

4.5.2.4. Have flat washers installed on spherical rod ends to prevent bearing pull-out.

4.5.2.5. Be equipped with universal or other flexible joints which meet or exceed those used for similar purposes by recognized motor vehicle manufacturers. Such devices must be securely installed and used within designed parameters.

4.5.3. The steering gear box or other mechanism which translates the rotary motion of the control shaft to linear motion to move the wheels shall be securely attached to the vehicle frame with hardware designed for this purpose.

4.5.4. All components of the steering system shall be connected with fittings designed for the purpose and adjusted to eliminate any unnecessary free play or lash.

4.5.5. All welding used in the modification of any system component or attachment shall be accomplished by an electric arc welding process.

4.5.5.1. Gas welding is permitted for those types of metal not suitable for electric arc welding.

4.5.5.2. No welding repairs or welding modifications of any type shall be permitted on cast iron or factory cast steering components.

4.5.6. Any power steering device used on a modified vehicle shall be of a type which will permit the continued use of the power steering mechanism under manual control in the event of the failure of the power unit (except OEM).

4.5.7. Four wheel steering system, e.g., front and rear steering axles, are not permitted (except OEM).

4.5.8. Any protective covering of C. V. joints, steering mechanisms, or other components commonly referred to as "Boots" cannot be cracked, broken, lose or in any way damaged or leaking.

4.6. Suspension System.

4.6.1. Lift blocks of any type or configuration on the front suspension of a modified vehicle is expressly prohibited.

4.6.2 The use of coil spring spacers to level the front end of the vehicle are permissible.

4.6.3. Every modified vehicle shall be equipped with a flexible primary suspension component (spring, torsion bar, etc.) mounted between the vehicle frame, or unit body, and each axle, or other component to which the wheels are mounted (trailing arms, control arms, etc.), which:

4.6.3.1. Permits vertical relative movement between the frame and axle.

4.6.3.2. Permits negligible lateral (side to side) or longitudinal (front to rear) horizontal movement between the frame and the axle.

4.6.3.3. Is securely attached to both the frame and the axle with mounting hardware designed for this purpose.

4.6.3.4. Provides adequate support for the safe control of the vehicle under all normal conditions of operation upon public streets and highways.

4.6.4. Each position on an axle of a modified vehicle where one or more wheels are mounted shall be equipped with at least one shock absorbent which:

4.6.4.1. Is mounted between, and securely attached to, the axle and the frame with mounting hardware designed for this purpose.

4.6.4.2. Provides a damping action on all vertical motion (double acting) throughout entire vertical motion range of the primary suspension component.

4.6.5. At each position where one or more wheels are mounted, the suspension system of a modified vehicle shall provide a minimum range of vertical motion between the axle and the frame of two (2) inches for compressions and two (2) inches for rebound when the empty vehicle is standing upon a level surface.

4.6.6. The range of movement between the axle and the frame of a modified vehicle shall be limited in a manner which, under all normal conditions of suspension and rebound, will prevent:

4.6.6.1. Contact between the wheels, including the tires, and any part of the vehicle frame or chassis.

4.6.6.2. Contact between the suspended and unsuspended portions of the vehicle except at suspension component attachment points and at those points which are designed and suitably cushioned to limit extreme suspension movement.

4.6.6.3. Any brake hose from becoming fully extended.

4.6.6.4. Any shock absorber from reaching the limit of its travel.

4.6.7. Any primary or supplemental coil springs used in the suspension system of a modified vehicle shall not be capable of being fully compressed or fully extended within the limits of vertical motion of the system.

4.6.8. A modified vehicle shall have sufficient ground clearance between the vehicle body chassis and/or steering components and the road surface on which the vehicle rests so that it shall be able to be in motion on its four rims on a flat surface with no other parts of the vehicle touching that surface.

4.6.9. When used in the suspension system of modified vehicle, all leaf spring hanger (shackle)

extensions shall:

4.6.9.1. Have a maximum effective length of no more than two inches over the OEM shackle as measured between the upper and lower bolt centers.

4.6.9.2. Be assembled with bolts and hangers specifically designed with adequate extra strength for this purpose.

4.6.10. No coil spring, leaf spring, or torsion bar used in the suspension system of a modified vehicle shall be heated or welded.

4.6.11. Any electric, hydraulic or pneumatic device used to adjust the height of a vehicle cannot be capable of raising the front or rear of the vehicle more than four (4) inches over the OEM ride height and can in no way alter the steering geometry of the vehicle (unless OEM).

4.6.12. The wheel base on one side of the vehicle must be the same as the wheel base on the opposite side. Tolerance plus one inch.

4.7. Exhaust System (combustion power units only).

4.7.1. All modified vehicles shall be equipped with a system of components to conduct exhaust gases from the engine to a safe discharge point outside of the vehicle.

4.7.2. All exhaust system components, such as manifolds, headers, exhaust pipes, resonators, mufflers, converters, tail pipes, etc., shall:

4.7.2.1. Be located outside of any compartment intended for use by the driver or any passenger.

4.7.2.2. Be securely attached with fasteners designed for this purpose.

4.7.2.3. Be positioned so as not to contact any moving vehicle component.

4.7.2.4. Be free of any leakage.

4.7.2.5. Have suitable shielding provided for all components which may cause personal injury and are accessible to inadvertent contact by persons standing outside of the vehicle under normal operating conditions.

4.7.2.6. Have no temporary patches or makeshift repairs.

4.7.3. Suitable heat shielding shall be provided for:

4.7.3.1. Any catalytic converter located less than three (3) inches below the floor pan or from any flammable material.

4.7.3.2. Any other exhaust system component located less than one and one-half (1 1/2) inches below the floor pan or less than three (3) inches from any flammable material.

4.7.4. The exhaust system shall contain a muffler or mufflers. Such mufflers shall be the muffler originally installed by the manufacturer of the vehicle or, if a replacement, the equivalent thereof.

4.7.5. The exhaust system shall discharge the engine exhaust gases outward from the vehicle to the atmosphere.

4.7.5.1. Exhaust systems on property-carrying vehicles shall discharge the exhaust gases to the rear of that part of the vehicle designed and normally used for carrying the driver and passengers.

4.7.5.2. Exhaust systems on passenger vehicles shall discharge the exhaust gases at a location to the rear of the vehicle body or direct the exhaust gases outward from the side of the vehicle body at a location rearward of any operable side window.

4.7.5.3. No part of the exhaust system shall pass through any area of the vehicle that is used as a passenger compartment, nor in close proximity to the fuel system without being properly shielded. No part of the exhaust system may contain a muffler cut-out or by-pass.

4.8. Wheels and Tires.

4.8.1. The rims mounted on a modified vehicle, if other than OEM (including options) or OREP, i.e., special rims, shall meet or exceed all applicable Federal Motor Vehicle Standards.

4.8.2. All rims mounted on a modified vehicle shall be free of cracks, rim dents, warpage, and repairs of any kind.

4.8.3. All rim mounting studs, nuts or bolts shall be present, in good condition, and securely tightened.

4.8.4. All rims mounted on a particular axle or equivalent front or rear suspension component, shall be of identical size, design, and material (all front rims the same and all rear rims the same).

4.8.5. The rim diameter of the rims mounted on the front axle shall be no less nor no greater than two (2) inches as the rim diameter of the OEM rims for the suspension system used.

4.8.6. The use of any combination of reverse mounted or special rims or adapters shall not increase the negative offset of the front or rear rims in a manner that will reduce the track width of the vehicle. The modified vehicle owner shall provide the rim offset specifications and the manner of measurement from the recognized manufacturer of the vehicle when it was new, if requested.

4.8.7. The use of any combination of reverse mounted or special rims or adapters shall not increase the positive offset of any of the rims by more than two (2) inches. Any increases in positive offset for wheels on one side of a vehicle should be the same as for the wheels on the opposite side.

4.8.8. All tires used on the rims of a modified vehicle shall have a load rating of sufficient capacity to support the weight imposed on both the tire and rim.

4.8.9. All tires mounted on the rims of modified vehicle shall be tires designed specifically for highway use (FMVSS No. 109 and No. 119) including those designed for highway use and retreaded in

accordance with FMVSS No. 117. The use of tires designed, retreated or designated for any other purpose is not permitted.

4.8.10. Every tire mounted on the rims of a modified vehicle shall have an average tread depth of no less than 2/32 of an inch.

4.8.11. The outermost edge of tires mounted on a modified vehicle shall not extend laterally beyond the outboard edge of the fender, the fender well, or other wheel enclosure including flared fender openings when viewed from above.

4.8.11.1. Maximum width of fender flares is three (3) inches as measured from the outside edge of the original fender or configuration to the outermost edge of the flare.

4.8.12. Wheel studs must be of sufficient length to allow a minimum of two threads to project beyond the lug nut. Where capped lug nuts are used, all wheel studs must project into the hex portion of the lug nut by a distance equal to at least one diameter of the stud.

4.8.13. Minimum width of any tire on any axle of a modified vehicle will be five (5) inches.

4.9. Miscellaneous.

4.9.1. If equipped with an automatic transmission, it must be equipped with an interlock that causes the engine starter to be inoperative when the transmission shift lever is in a forward or reverse drive position unless OEM.

MODIFIED VEHICLE INSPECTION

GENERAL REQUIREMENTS

Any vehicle operated upon a highway with a gross vehicle weight rating of less than 10,000 pounds which has been raised in altitude from the original manufacturer's specifications or configuration must undergo a modified vehicle inspection.

The Superintendent of the West Virginia State Police may authorize inspection stations to conduct modified vehicle inspections. Provided the stations have been certified and approved as an Official Modified Vehicle Inspection Station and can produce proof that an inspector mechanic employed by them has a good working knowledge of original manufacturer's specifications. The inspector mechanic must also successfully pass the test and be certified as a Modified Vehicle Inspector Mechanic.

Persons desiring inspection of a modified vehicle must deliver their vehicle to an Official Modified Vehicle Inspection Station that has been certified and approved as such by the West Virginia State Police.

Modified Vehicle Inspector Mechanics will follow the same preliminary guidelines in the inspecting of modified vehicles, i.e. proof of insurance and ownership, etc.

Upon examination of the insurance card and ownership forms, the standard motor vehicle inspection certificate will be removed. The Modified Vehicle Inspector Mechanic will then conduct a standard state inspection and also inspect those areas as outlined in the Modified Vehicle Inspection Requirements. If the vehicle fails to pass either the regular vehicle inspection or the modified vehicle inspection requirements, the inspector mechanic will place a rejection sticker on the vehicle in accordance with the already prescribed standards. If the vehicle passes all requirements, a modified vehicle inspection sticker will be placed on the vehicle. The modified vehicle inspection sticker will be the **only** inspection sticker required on these vehicles. This sticker will be completed on the back by the inspector mechanic, and the appropriate date punched and placed in the lower left (driver's side) corner of the windshield, much the same as the original inspection certificate.

All inspections will be entered on a yellow modified vehicle inspection log sheet. Upon completion of the modified vehicle inspection log sheet, the original and all copies will be handled the same as with standard inspection forms.

GENERAL VEHICLE INSPECTION

GENERAL REQUIREMENTS (Continued)

Modified vehicle inspection stickers will be requisitioned from the West Virginia State Police, Traffic Records Section, 725 Jefferson Road, South Charleston, West Virginia 25309, on the appropriate yellow requisition form (DPS-MVI-4B) as per established rules and regulations.

Maximum charges of the modified vehicle inspection will be as follows:

LABOR	- $15.00
STICKER	- $10.00
TAX	- $ .90
TOTAL INSPECTION CHARGES	- $25.90

Maximum inspection charges do not include additional repair costs.

If there is any question, inspector mechanics are directed to refer back to the provisions of the West Virginia State Police Inspection Manual for standard vehicle inspection or contact their area supervisor.

QUALIFICATONS - MODIFIED VEHICLE INSPECTION STATION

1. Station applying must be a certified inspection station for three (3) consecutive years immediately preceding the application to be considered for licensing as a Modified Vehicle Inspection Station.
2. Station applying must be *FREE* of any suspension of its appointment as an official inspection station within the three (3) year period immediately preceding the filing of an application.
3. Station must have a minimum of one (1) modified motor vehicle inspector mechanic other than the owner of the station.
4. Station must be at least a certified one (1) car inspection station.

QUALIFICATIONS - MODIFIED VEHICLE INSPECTOR MECHANIC

1. Modified vehicle inspector mechanics must have a minimum of three (3) years continuous experience as a licensed inspector mechanic.
2. Modified vehicle inspector mechanics must be employed at a licensed modified vehicle inspection station.
3. Modified Vehicle Inspector Mechanics must have a valid West Virginia Operator's License and valid Inspector Mechanics License and may not have been suspended by the West Virginia State Police.
4. Modified Vehicle Inspector Mechanics must renew their Modified Vehicle Inspector Mechanic's License every four (4) years from the date of issuance.

5. Modified Vehicle Inspector Mechanics successfully completing the modified vehicle inspector mechanic's training class and examination shall surrender their Inspector Mechanic's License and obtain the Modified Vehicle Inspector Mechanic's License.

PENALTIES FOR INSPECTION VIOLATIONS

The following shall limit penalties against the inspection station or inspection station mechanic or against both the inspection station and the inspection station mechanic:

1. **Sale or Gift of Sticker.**

   A. Any owner, operator, or mechanic guilty of this offense shall have his/her inspector mechanic's card or certificate of appointment cancelled permanently.

2. **Affixing Stickers without Proper Inspection and Approval.**

   A. Any owner, operator, or mechanic who, for the first offense, affixes a sticker to a vehicle without proper inspection may be suspended for a period of one (1) year.

   B. Any owner, operator or mechanic who, for the second or subsequent offense, affixes a sticker to a vehicle without proper inspection may be permanently suspended.

3. **Lack of Ability: Mental, physical or mechanical.**

   A. Any Offense - Suspended until there is full compliance.

4. **Improper Records: Dirty or Inaccurate.**

   A. First Offense - Letter of Warning.

   B. Second or Subsequent Offense - Within two (2) years of first offense, may result in six (6) months suspension of station license.

   C. Third or Subsequent Offense - Within two (2) years of second or subsequent offense may result in a one (1) year suspension of station license.

5. **Fraudulent Entry on Log Sheets.**

   A. Any owner, operator or mechanic making fraudulent entries on log sheets, for the first offense, may have his/her inspector mechanic's card or certificate of appointment suspended for one (1) year.

   B. Any owner, operator or mechanic who, for the second or subsequent offense, within five (5) years of the first offense, shall have his/her inspector mechanic's card or certificate of appointment permanently suspended.

6. **Dirty Garage.**

   A. First Offense - Letter of Warning.

   B. Second or Subsequent Offense - Certificate of appointment may be suspended for a period not to exceed six (6) months.

   C. Third or Subsequent Offense - Certificate of appointment may be permanently suspended.

7. **Loss of Stickers.**

A. First Offense - Letter of Warning.

B. Second Offense - certificate of appointment may be suspended for a period not to exceed one (1) year.

C. Third or Subsequent Offense - May result in a permanent suspension of certificate of appointment.

8. **Permitting Unauthorized Personnel to Inspect Vehicles.**

A. First Offense - Certificate of appointment may be suspended not to exceed one (1) year.

B. Second or Subsequent Offense - May result in a permanent suspension of certificate of appointment.

9. **Conducting Inspections at Locations Other Than Those Designated and Approved.**

A. First Offense - Certificate of appointment may be suspended for a period not to exceed one (1) year.

B. Second or Subsequent Offense - Certificate of appointment shall be permanently suspended.

10. **Failure to Follow Official Inspection Procedure.**

A. First Offense - Letter of Warning to station. Inspector Mechanic may be suspended for a period not to exceed six (6) months.

B. Second or Subsequent Offense - Certificate of appointment may be suspended for a period not to exceed one (1) year. Inspector Mechanic may be suspended for the same period of time.

C. Third or Subsequent Offense - May result in a permanent suspension of inspector mechanic's card and certificate of appointment.

11. **Unnecessary Repairs.**

A. First Offense - Any owner, operator or mechanic who, for the first offense, proposes or does any unnecessary repairs to any vehicle shall have his/her inspector mechanic's card and certificate of appointment permanently suspended.

12. **Owner/Operator Responsibility.**

A. Upon appointment as an official inspection station, the owner and/or operator will have assumed full responsibility for following the procedures of the inspection manual. The owner and/or operator will be responsible for the actions of his/her employees in the adherence to all rules and regulations pertaining to inspection procedures. In accepting this responsibility, the owner and/or operator may be subject to suspensions for a like period of time in regard to a violation committed by one of his/her employees.

13. Refusal to Inspect.

A. First Offense - Any owner or mechanic who, for the first offense, refuses to inspect any vehicle without proper cause may have his /her inspector mechanic's card and certificate of appointment suspended for one (1) year.

B. Second or Subsequent Offense - Any owner, operator or mechanic who, for the second or subsequent offense, refuses to inspect any vehicle without proper cause within two (2) years of first offense may have his/her inspector mechanic's card and certificate of appointment permanently suspended.

14. Going Out of Business.

A. Any owner who changes locations of his/her business or cancels the appointment of his/her business and fails to notify the area supervisor and the Traffic Records Section immediately in writing for the first offense, may lose his/her certificate of appointment for future consideration permanently.

15. Failure to Have Adequate Supply of Stickers.

A. It is the responsibility of the owner and/or operator to make certain that an ample supply of stickers be on hand at all times. This includes motorcycle/trailer stickers, motor vehicle stickers, and modified vehicle stickers.

1. Any owner, operator or mechanic who places a sticker on a vehicle and that sticker is a non-current for the year or month purchased shall, for the first offense, receive a suspension of three (3) months. Second or subsequent offense - two (2) years suspension.

2. Any owner and/or operator who fails to have proper stickers on hand because of his/her negligence in placing an order form to the Traffic Records Section shall, for the first offense, receive a letter of warning. Second or subsequent offense - six (6) months suspension.

(Suspension of license to an inspection station will apply to the building site as well as the individual to whom the license was issued.)

MODIFIED VEHICLE INSPECTION

DEFINITIONS

CONSTANT VELOCITY OR C. V. JOINT
On front wheel drive vehicles, the part of the drive axle shaft which allows for the application of torque and the turning of the wheels simultaneously.

F.M.V.S.S.
Federal Motor Vehicle Safety Standard

MODIFIED VEHICLE
A vehicle which has been raised in altitude from the manufacturer's original height.

"OEM"
Original Equipment Manufacturer. A part or component of the vehicle which is identical to the part or component on the original vehicle and is supplied by the recognized manufacturer of the original vehicle.

"OER"
Original Equipment Replacement. A vehicle part or component which performs the identical function as the part or component of the original vehicle but is supplied by a manufacturer other than the recognized manufacturer of the original vehicle.

"OREP"
Original Replacement Essential Part means any part or component of a vehicle which is:

(1) Identical in fact or in performance to any part or component offered as an option for that vehicle by the original manufacturer of the vehicle when new;

(2) Essential for the safe operation of the vehicle; and

(3) Purchasable through auto parts stores or dealerships of the original vehicle manufacturer.

Examples include, but are not limited to, parts and components of a vehicle's engine, transmission, differential, steering system, suspension system, exhaust system, intake system, body parts or lamps and reflectors. A part or component which may alter the performance of a vehicle or may inherently affect adversely the safety or structural integrity of a vehicle, its occupants, or surrounding vehicles or individuals, unless specifically exempted in these rules, shall not be an original replacement essential part.

RECOGNIZED MOTOR VEHICLE MANUFACTURER
A person engaged in the business of manufacturing or assembling motor vehicles who has filed an identification statement with the US Department of Transportation and is applying certification tags to the vehicles being manufactured in accordance with Part 567 or Title 49, The Code of Federal Regulations.

SAE
Society of Automotive Engineers

SHOCK ABSORBER
A Generic Term which is commonly applied to hydraulic or pneumatic mechanisms used for the purpose of damping or suppressing oscillatory motion of vehicle bodies.

SPLIT SERVICE BRAKE SYSTEM
Means a brake system consisting of two or more subsytems actuated by a single control designed so that a leakage-type failure of a pressure component in a single sub-system (except structural failure of a housing that is common to two or more sub-systems) shall not impair the operations of any other sub-system).

STEERING SYSTEM
The assembly of mechanical, structural, pneumatic or hydraulic components which allows for movement of the vehicle to the right or left.

STREET ROD
Vehicles constructed from parts or other vehicles, and may not be readily recognizable by the existing title and/or registration descriptions. These vehicles may also include changes to steering, brake and suspension systems, engine and chassis components.

SUSPENSION SYSTEM
That assembly of mechanical, structural, pneumatic or hydraulic members which provides a flexible support between the ground or roadway and the engine, load and passenger carrying structure of the vehicle.

WHEEL BASE
The distance in inches from the center of the front wheel to the center of the rear wheel as measured in a straight line from the front to rear wheel of the same side of the vehicle. Whenever referred to within these regulations, wheel base will be the original manufacturer's specifications with no modification.

WHEEL TRACK
The distance in inches from the center of the tire of one axle to the center of the opposite tire of the same axle as measured in a straight line across the vehicle. Whenever referred to within these regulations, wheel track will be the original manufacturer's specification with no modification.

MODIFIED VEHICLE INSPECTION REQUIREMENTS

I. **Fuel System (combustion power units only).**

A. Requirements

(1) Each fuel system orifice provided for the introduction of air to be used for the combustion of fuel (air intake) shall be equipped with a device which will:

(a) Prevent the ejection into the atmosphere of any ignited fuel/air mixture.

(2) All fuel system components, such as tank, tubing hoses, clamps, etc., shall:

(a) Be located outside of any compartment intended for use by the driver or any passenger (except OEM or OREP components); and

(b) Be securely attached with fasteners designed for this purpose; and

(c) Not be positioned above, or nearer than three (3) inches to any exhaust system component except in the engine compartment, unless appropriate shielding is provided except OEM or OREP components); and

(d) Be positioned so as not to contact any moving vehicle component; and

(e) Be free of any fuel leakage.

(3) Fuel line connection to the engine shall be of a flexible design, and of a length sufficient to accommodate all engine vibrations and movements of the engine with respect to the vehicle frame.

(4) The fuel tank shall:

(a) Not be located in the engine compartment (except OEM or OREP components); and

(b) Be shielded from any compartment intended for use by the flame-proof barrier (except OEM or OREP components); and

(c) Be securely mounted to the body or frame; and

(d) Comply with VESC-12 (minimum standard for fuel tanks) if not built by a recognized motor vehicle manufacturer; and

(e) Be equipped with an external vent or be vented to the engine through an Evaporative Emission Control (EEC) system; and

(f) Be equipped with a filler cap designed to vent fuel spillage from the filler opening when the cap is in place; and

(g) Be located within the lateral perimeter of the vehicle frame or unit body to minimize crash damage rupturing (unless originally equipped).

(5) Auxiliary liquid fuel tanks described as an additional fuel tank and any other components attached directly thereto designed to supplement the vehicle's liquid fuel carrying capacity beyond that provided by the vehicle manufacturer shall meet the requirements of VESC-12.

(a) No beer barrel type fuel tanks permitted.

II. Vehicle Body

A. Requirements

(1) **Body Structure.** The body structure of a modified vehicle shall be free of sharp edges and projections in all interior and exterior locations where they may be contacted by persons in the normal use and care of the vehicle. This requirement does not include those locations usually accessible only when the vehicle is hoisted or partially dismantled for the purpose of maintenance or repair. No rust holes permitted.

(a) The body to frame mounting hardware shall be in accordance with OEM specifications with a maximum three inch spacer block used, in addition to manufacturer's installed body spacers providing that appropriate modifications of the steering column, brake hose location and controls are made when required.

(2) **Doors and Latches**

(a) A modified vehicle shall be provided with means of entry and exit on each side of the vehicle which provide ready access to the seats in vehicle by vehicle occupants.

(b) On vehicles not equipped with doors, approved type occupant restraining devices shall be installed within the vehicle and be readily accessible to the occupants.

(c) The doors used to provide access to the passenger compartment of a modified vehicle shall be of a hinged type and shall be readily operable and be provided with a two position self-acting latch which functions in each latching position to keep the door from opening (unless OEM).This requirement does not apply to doors that are designed to be easily attached to or removed from modified vehicles designed for operation without doors.

(d) All doors shall be equipped with a manual latch control on the interior of the door and a manual latch on the exterior of the door.

(3) **Hood and Trunk Latches**

(a) Hood - Vehicle is required to have hood which shall cover top of entire engine compartment.

(b) A hood, a trunk lid, or any compartment cover forward of the windshield, which opens along the edge toward the front of a modified vehicle shall be equipped with a two-position self-acting latch which functions in each latching position to keep the hood, lid, or cover closed. A maximum of two hood pins designed for that purpose can be substituted for the two-position self-acting latch.

(c) A hood, trunk lid, or compartment cover which opens along an edge toward the sides or the rear of a modified vehicle shall be equipped with at least one latch which holds the hood, lid or cover in the closed position.

(4) **Fenders.** Each tire of a modified vehicle which contacts the surface of the road shall be equipped with a fender, or other body structure, which covers the entire width of the tire above that portion of the circumference from 15 degrees in front to 75 degrees to the rear of the vertical line through the center of the wheel hub. (See chart on page 28). Note: Any attachment added to the body or fender of the vehicle to meet the requirements of this part shall be securely mounted and free of any sharp edges or protuberances. Motorcycle type (movable) front fenders are permitted providing the vehicle is equipped with a front bumper.

(5) **Driver Visibility.** Every modified vehicle shall provide the driver with:

(a) Obstructions forward of the windshield can extend no more than three (3) inches upward into the horizontally projected vision area of the windshield except for windshield wiper components.

III. Vehicle Frame

A. Requirements

(1) **Frame.** A modified vehicle shall be equipped with a frame consisting of structural beams or channels, or structural tubing, or unitized construction capable of supporting the vehicle, its load, and the torque produced by the power source under all conditions of operation. The frame structure shall be essentially rigid, free of cracks and visual indications of weakness, such as bending, buckling or poor quality welded joints.

(2) **Floor Pan.** A modified vehicle shall be equipped with a floor pan which:

(a) Covers the area beneath the passenger compartment and any cargo (luggage) compartment that is not entirely separate from the passenger compartment. (Entirely separate means there are no components shared by both compartments, such as roof, floor, or sides.); and

(b) Is capable of supporting the weight of the number of occupants, including seats and any cargo the vehicle is designed to carry; and

(c) Has sufficient strength to adequately anchor the seats and safety belts; and

(d) Is free of openings which are not sealed or provided with covers which are specifically designed to prevent the transit of fumes and airborne particles.

(3) **Bumpers.** A modified vehicle shall be equipped with a bumper on the front and the rear of the vehicle with the exception of trucks, utility and special motor vehicles where the original or predominant body configuration, provided by a recognized manufacturer, did not include such bumper or bumpers in the design of the vehicle. OEM or OREP bumpers are acceptable.

Front bumpers are required on any modified vehicle if the front fenders provide less than 75 degrees of tire circumference coverage measured from the vertical center line of the wheel to the front of the vehicle.

Front bumpers are required on any modified vehicle if there are any sharp or otherwise hazardous parts projecting from the front of the vehicle.

Front bumpers are required on any vehicle equipped with motorcycle type (movable) front fenders.

Rear bumpers are required on any modified motor vehicle if the fuel tank is located in the rear and is unprotected by the frame of the vehicle.

Whenever the bumpers installed on a modified vehicle are altered, modified, replaced, or whenever the vehicle ground clearance height has been altered or modified, the bumpers installed on the vehicle shall:

(a) Be of a sturdy construction; and

(b) Be securely attached to the vehicle frame with attaching components specifically designed for the purpose which are equivalent in strength to the bumper; and

(c) Have no pointed projections or sharp edges; and

(d) Have a smooth outward face.

(e) *Be at least 3 inches in vertical height, be centered on the vehicle center line and extend horizontally no less than the wheel track distance; and*

(f) Be mounted no higher than specified from the ground to the bottom of the bumper. Maximum bumper heights shall be as indicated below:

(1) *Vehicle 10,000 pounds or less: Maximum height to both front and rear bumper is thirty-one (31) inches as measured from the ground to the bottom of the bumper. The distance from the vehicle frame mount seat to the vehicle body mount seat cannot exceed three (3) inches in addition to manufacturer's body installed body spacers. No person may alter, modify, or otherwise move the original bumper mounting on the frame. In the absence of bumpers, the bumper height will be measured to the frame rail.*

(2) All above measurements will be made with all tires on the vehicle inflated to the tire manufacturer's specifications.

IV. Brake Systems

A. Requirements

(1) Every modified vehicle shall be equipped with a service brake system which:

(a) Will provide braking action at each wheel; and

(b) Is actuated by pressure applied to a pedal control by the driver's foot; and

(c) Is actuated primarily by the use of hydraulic fluid (actuation primarily by mechanical means, rods, or cables, is not permitted even if the OEM system was so designed).

(2) Modified vehicles shall be equipped with a service brake system which:

(a) Is designed to prevent the complete loss of the braking function in the event of a rupture or leakage-type failure of any single pressure component except structural failures of the master cylinder (split system required); and

(b) Is equipped with a combination of components, i.e. master cylinders, calipers, wheel cylinders, metering valves, proportioning valves, etc. which is in accordance with current accepted automotive industry standards.

(3) Brake tubing and brake hose installed on a modified vehicle shall be:

(a) Securely attached with hardware designed for this purpose, in a manner which will prevent chafing, kinking, or other mechanical damage; and

(b) Of sufficient length and flexibility to accommodate, without damage, all normal movements of the parts to which it is attached; and

(c) Located in a manner that prevents contact with any component of the vehicle's exhaust system.

(d) Routed along the exterior of box or tubular frame chassis. (Routing tubing or hoses through the interior or along bottom edge of such frame or tubing is prohibited).

(4) All tubing, other than OEM, used in the service brake system of a modified vehicle shall be of a type that meets the requirements of SAE standard J1047, Tubing - Motor Vehicle Brake System, Hydraulic.

(5) All brake tubing ends must be double flared in a manner consistent with SAE standard J533b or formed in accordance with SAE recommended practice J1290.

(6) All hoses, other than OEM, used in the service brake system of a modified vehicle shall be of a type that meets the requirements of FMVSS-106.

(7) Every modified vehicle shall be equipped with a parking brake system which:

(a) Provides braking action on at least two wheels of the same axle; and

(b) Is actuated by a control that is operated by the driver's hands or foot and remains set in the applied position until released by a separate action; and

(c) Is actuated by a means independent of the service brake system except that the brake shoes and drums, or pads and discs, may be common to both the service and parking brake systems.

V. Steering System

A. Requirements

(1) The steering control mechanism of a modified vehicle shall:

(a) Consist of a circular steering wheel having an outside diameter of no less than 13 inches attached to a shaft in a manner such that the rotary motion of the control device turns the shaft which will cause the moving vehicle to move to the right when the control is rotated in a clockwise direction and to the left when the control is rotated in a counterclockwise direction; and

(b) Be securely attached to a structural member of the vehicle; and

(c) Be located forward of the driver's seating position; and

(d) Be operable through its entire control range by a person seated against the seat back at the driver's position; and

(e) Not interfere with the driver's vision through the windshield nor interfere with any other vehicle control mechanism; and

(f) Be so constructed that no components or attachments, including horn actuating mechanism and trim hardware can catch the driver's clothing or jewelry during normal driving maneuvers.

(g) Have no other component or structure located between the driver and the device except safety belts and/or air bags; and

(h) Have no other component or structure located in the plane of rotation nearer than 3 inches outside of the path of the maximum radius of the control device (unless OEM); and

(i) Have a range of rotation (lock to lock) of no less than 2 turns (360 degree rotation per turn) and no more than 6 turns and shall be

free of any jamming or binding throughout this range. From a straight ahead position, the number of turns to the right stop shall be equal to the number of turns to left stop. One quarter turn tolerance permitted.

(2) A modified vehicle equipped with a steering system that has been modified in any manner except replacement of the steering wheel shall:

(a) Have the steering components geometrically arranged in accordance with the manufacturer's specifications.

(b) Comply with the original vehicle manufacturer's caster, camber and toe-in alignment specifications.

(c) Have all nuts equipped with appropriate locking devices such as lock washers, cotter pins or selflocking devices. If selflocking nuts are used, at least one complete bolt thread must pass through the nut and be exposed; and

(d) Have flat washers installed on spherical rod ends to prevent bearing pull-out; and

(e) Be equipped with universal or other flexible joints which meet or exceed those used for similar purposes by recognized motor vehicle manufacturers. Such devices must be securely installed and used within designed parameters.

(3) The steering gear box or other mechanism which translates the rotary motion of the control shaft to linear motion to move the wheels shall be securely attached to the vehicle frame with hardware designed for this purpose.

(4) All components of the steering system shall be connected with fittings designed for the purpose and adjusted to eliminate any unnecessary free play or lash.

(5) All welding used in the modification of any system component or attachment shall be accomplished by an electric arc welding process.

(a) Gas welding is permitted for those types of metal not suitable for electric arc welding.

(b) No welding repairs or welding modifications of any type shall be permitted on cast iron or factory cast steering components.

(6) Any power steering device used on a motor vehicle shall be of a type which will permit the continued use of the power steering mechanism under manual control in the event of the failure of the power unit (except O.E.M.).

(7) Four wheel steering systems, e.g. front and rear steering axles, are not permitted (except O.E.M.).

(8) All modified vehicles shall meet minimum scrub line requirements.

(a) Scrub Line is an imaginary surface created if lines were drawn from bottom of wheel rim on one side to bottom of tire on other side. When lines are drawn from both sides, an "X" under the vehicle suspension is created. No suspension or chassis component shall be below top portion of the imaginary "X". (See charts on pages 22 and 23).

(9) Any protective covering of C. V. joints, steering mechanisms, or other components commonly referred to as "Boots" cannot be cracked, broken, loose or in any way damaged or leaking.

VI. Suspension System

A. Requirements

(1) *Lift blocks of any type or configuration on the front suspension of a modified vehicle is expressly prohibited.*

(2) Every modified vehicle shall be equipped with a flexible primary suspension component (spring, torsion bar, etc.) mounted between the vehicle frame, or unit body, and each axle, or other component to which the wheels are mounted (trailing arms, control arms, etc.), which:

(a) Permits vertical relative movement between the frame and the axle; and

(b) Permits negligible lateral (side to side) or longitudinal (front to rear) horizontal movement between the frame and the axle; and

(c) Is securely attached to both the frame and the axle with mounting hardware designed for this purpose; and

(d) Provides adequate support for the safe control of the vehicle under all normal conditions of operation upon public streets and highways.

(3) Each position on an axle of a modified vehicle where one or more wheels are mounted shall be equipped with at least one shock absorbent which:

(a) Is mounted between, and securely attached to, the axle and the frame with mounting hardware designed for this purpose; and

(b) Provides a damping action on all vertical motion (double acting) throughout entire vertical motion range of the primary suspension component.

(4) At each position where one or more wheels are mounted, the suspension system of a modified vehicle shall provide a minimum range of vertical motion between the axle and the frame of two inches for compression and two inches for rebound when the empty vehicle is standing upon a level surface.

(5) The range of movement between the axle and the frame of a modified vehicle shall be limited in a manner which, under all normal conditions of suspension and rebound, will prevent:

(a) Contact between the wheels, including the tires, and any part of the vehicle frame or chassis; and

(b) Contact between the suspended and unsuspended portions of the vehicle except at suspension component points and at those points which are designed and suitably cushioned to limit extreme suspension movement; and

(c) Prevent any brake hose from becoming fully extended; and

(d) Any shock absorber from reaching the limit of its travel.

(6) Any primary or supplemental coil springs used in the suspension system of a modified vehicle shall not be capable of being fully compressed or fully extended within the limits of vertical motion of the system.

(7) A modified vehicle shall have sufficient ground clearance between the vehicle body chassis and/or steering components and the road surface on which the vehicle rests so that it shall be able to be in motion on its four rims on a flat surface with no other parts of the vehicle touching that surface.

(8) When used in the suspension system of modified vehicle, all leaf spring hanger (shackle) extensions shall:

(a) *Have a maximum effective lengh of no more than two inches over the OEM shackle as measured between the upper and lower bolt centers; and*

(b) Be assembled with bolts and hangers specifically designed with adequate extra strength for this purpose.

(9) *No coil spring, leaf spring, or torsion bar used in the suspension system of a modified vehicle shall be heated or welded.*

(10) *Any electric, hydraulic or pneumatic device used to adjust the height of a vehicle cannot be capable of raising the front or rear of the vehicle more than 4 inches over the O.E.M. ride height and can in no way alter the steering geometry of the vehicle (unless OEM).*

(11) The wheel base on one side of the vehicle must be the same as the wheel base on the opposite side. Tolerance + one inch.

VII. **Exhaust System (combustion power units only).**

A. Requirements

(1) All modified vehicles shall be equipped with a system of components to conduct exhaust gases from the engine to a safe discharge point outside of the vehicle.

(2) All exhaust system components, such as manifolds, headers, exhaust pipes, resonators, mufflers, converters, tail pipes, etc., shall:

(a) Be located outside of any compartment intended for use by the driver or any passenger; and

(b) Be securely attached with fasteners designed for this purpose; and

(c) Be positioned so as not to contact any moving vehicle component; and

(d) Be free of any leakage; and

(e) Have suitable shielding provided for all components which may cause personal injury and are accessible to inadvertent contact by persons standing outside of the vehicle under normal operating conditions; and

(f) Suitable heat sheilding shall be provided for:

(i) Any catalytic converter located less than three inches below the floor pan or from any flammable material; and

(ii) Any other exhaust system component located less than one and one-half inches below the floor pan or less than three inches from any flammable material; and

(g) Have no temporary patches or makeshift repairs.

(3) The exhaust system shall contain a muffler or mufflers. Such mufflers shall be the muffler originally installed by the manufacturer of the vehicle or, if a replacement, the equivalent thereof.

(4) The exhaust system shall discharge the engine exhaust gases outward from the vehicle to the atmosphere; and

(a) Exhaust systems on property-carrying vehicles shall discharge the exhaust gases to the rear of that part of the vehicle designed and normally used for carrying the driver and passengers; and

(b) Exhaust systems or passenger vehicles shall discharge the exhaust gases at a location to the rear of the vehicle body or direct the exhaust gases outward from the side of the vehicle body at a location rearward of any operable side window; and

(c) No part of the exhaust system shall pass through any area of the vehicle that is used as a passenger compartment, nor in close proximity to the fuel system without being properly shielded. No part of the exhaust system may contain a muffler cut-out or by-pass.

VIII. Wheels and Tires

A. Requirements

(1) The rims mounted on a modified vehicle, if other than OEM (including options) OREP; i.e., special rims, shall meet or exceed all applicable Federal Motor Vehicle Safety Standards.

(2) All rims mounted on a modified vehicle shall be free of cracks, rim dents, warpage, and repairs of any kind; and

(3) All rim mounting studs, nuts or bolts shall be present, in good condition, and securely tightened; and

(4) All rims mounted on a particular axle or equivalent front or rear suspension component, shall be of identical size, design, and material (all front rims the same and all rear rims the same); and

(5) *The rim diameter of the rims mounted on the front axle shall be no less nor greater than two inches as the rim diameter of the original equipment manufactured rims for the suspension system used; and*

(6) The use of any combination of reverse mounted or special rims or adapters shall not increase the negative offset of the front and rear rims in a manner that will reduce the track width of the vehicle. The modified vehicle owner shall provide the rim offset specifications and the manner of measurement from the recognized manufacturer of the vehicle when it was new, if requested; and

(7) The use of any combination of reverse mounted or special rims or adapters shall not increase the positive offset of any of the rims by more than 2 inches. Any increases in positive offset for wheels on one side of a vehicle should be the same as for the wheels on the opposite side.

(8) All tires used on the rims of a modified vehicle shall have a load rating of sufficient capacity to support the weight imposed on both the tire and rim; and

(9) All tires mounted on the rims of a modified vehicle shall be tires designed specifically for highway use (FMVSS No. 109 and No. 119) including those designed for highway use and retreaded in accordance with FMVSS No. 117. The use of tires designed, retreaded or designated for any other purpose is not permitted; and

(10) Every tire mounted on the rims of a modified vehicle shall have an average tread depth of no less than 2/32 of an inch; and

(11) The outermost edge of tires mounted on a modified vehicle shall not extend laterally beyond the outboard edge of the fender, the fender well, or other wheel enclosure including flared fender openings when viewed from above.

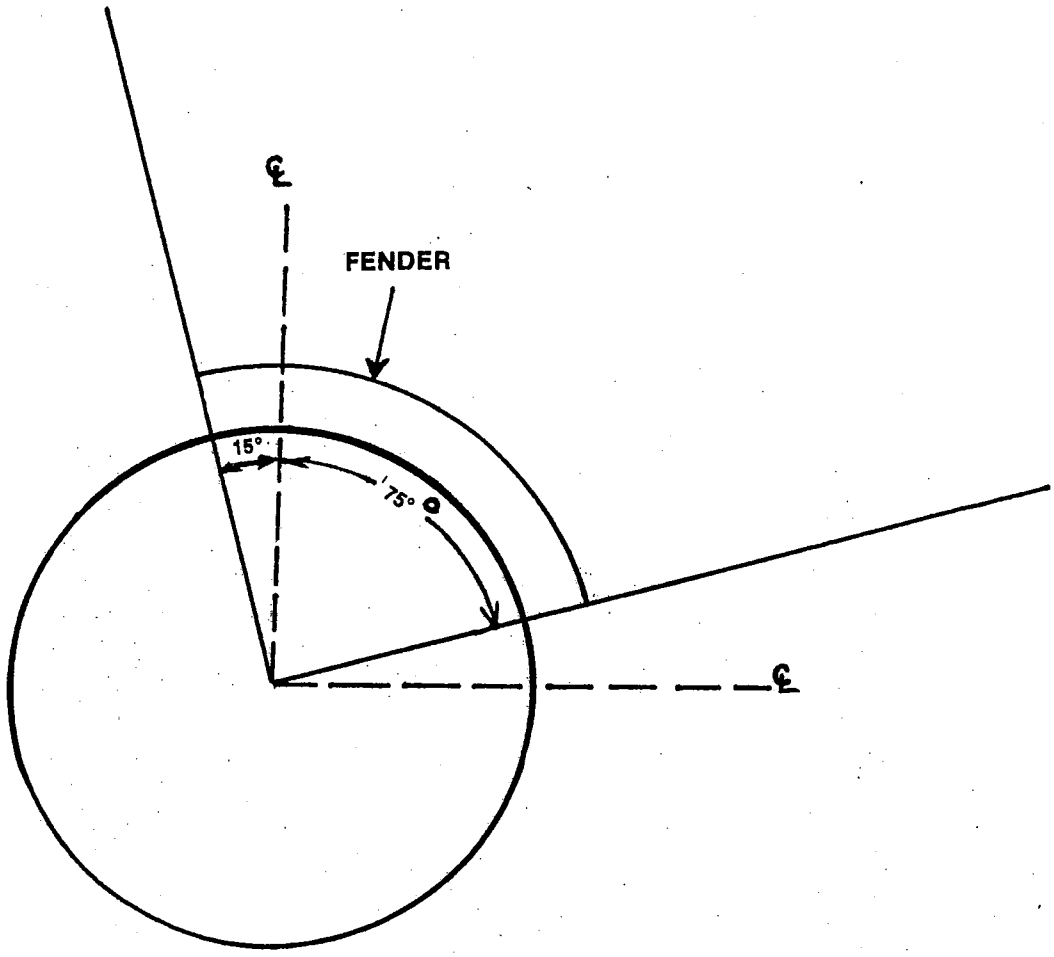
(a) *Maximum width of fender flares is 3 inches as measured from the outside edge of the original fender to the outermost edge of the flare.*

(12) Wheel studs must be of sufficient length to allow a minimum of two threads to project beyond the lug nut. Where capped lug nuts are used, all wheel studs must project into the hex portion of the lug nut by a distance equal to at least one diameter of the stud.

(13) *Minimum width of any tire on any axle of a modified vehicle will be 5 inches.*

IX. **Miscellaneous**

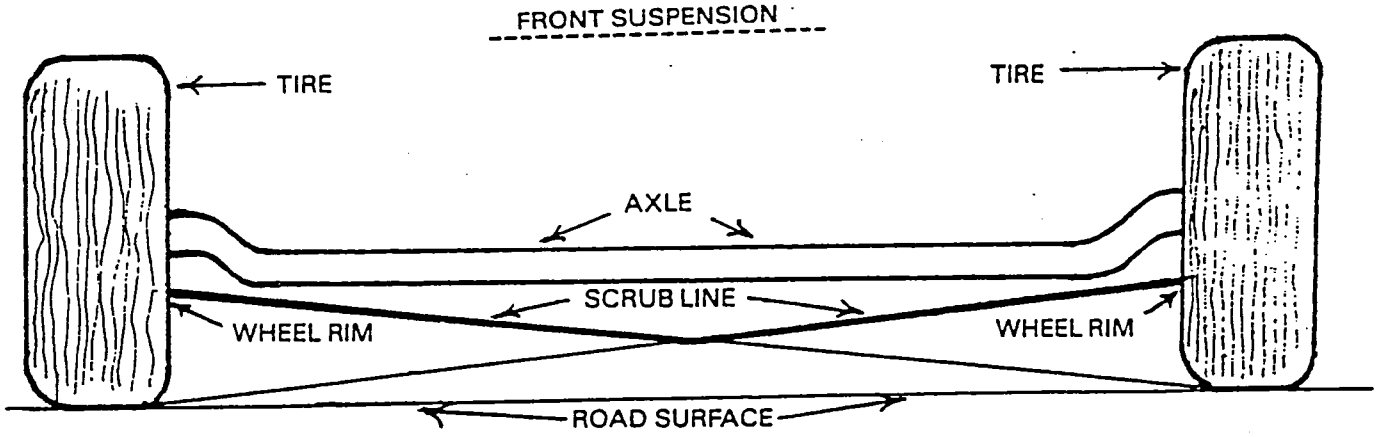
(1) If equipped with an automatic transmission, it must be equipped with an interlock that causes the engine starter to be inoperative when the transmission shift lever is in a forward or reverse drive position.

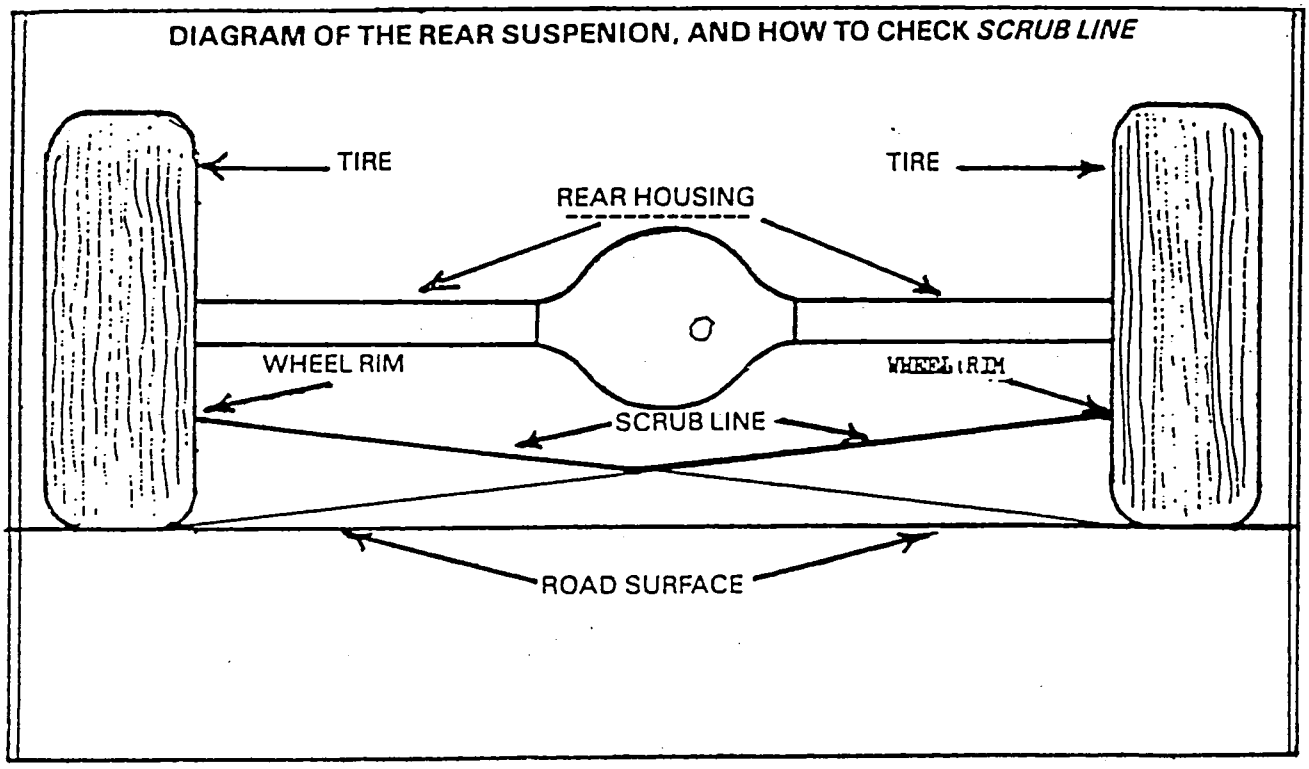


MINIMUM FENDER REQUIREMENT

SCRUB LINE
MODIFIED VEHICLES

A scrub line is an imaginary surface created if lines were drawn from bottom of wheel rim on one side to bottom of tire on other side. When lines are drawn from both sides an "X" under the vehicle suspension is created. No suspension or chassis component shall be below top portion of this imaginary "X".





BALL JOINT WEAR

There is a trend among U.S. automobile manufacturers toward the use of "wear-indicating" ball joints. Many vehicles on the road, however, do not have wear indicating ball joints. The inspection of both types will be discussed. ***NOTE:*** *Vehicle manufacturers do not recommend injection of materials into ball joints or suspension/steering components to fill voids caused by wear.*

[X] Ball Joints Without Wear Indicators

Equipment: Dial indicator, swivel and clamp. Floor jack or hoist, safety stand and pry bar.

Procedure:

- Depending on the construction of the suspension system, unload the ball joints by properly raising the vehicle. ***CAUTION:*** *Unloading front air spring suspension at incorrect location may result in damaged air spring.*
- Attach dial indicator to control arm to measure movement accurately between ball joint and its socket.
- To check vertical movement, position a pry bar under the front tire and with a lifting motion sufficient to overcome the weight of the wheel assembly, move wheel up and down and observe movement shown on dial indicator.
- To check horizontal movement, grasp the tire and wheel assembly at the top and bottom. Move in and out to detect looseness. (More horizontal movement is allowable because of the nature of most ball joint construction. Some manfuacturers do not accept horizontal movement as being indicative of ball joint wear).

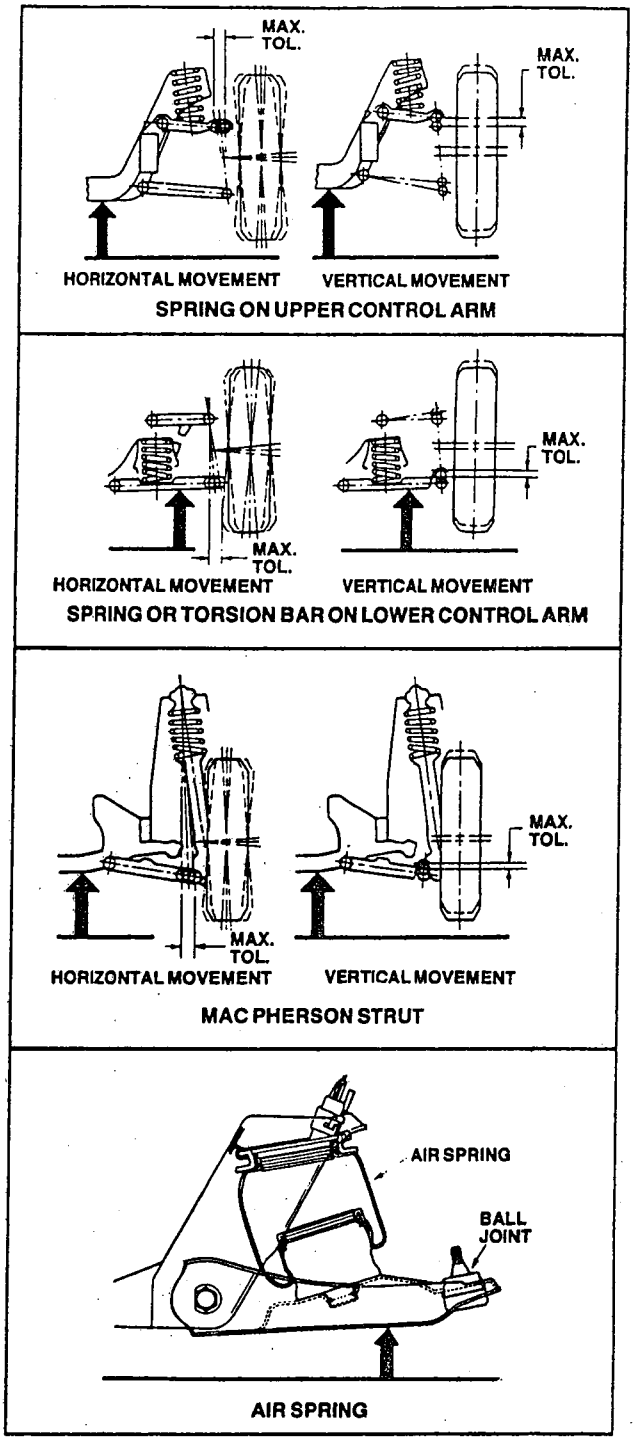
Reject Vehicle: If ball joint movement is in excess of manufacturers' service specifications shown in Table 1, thru 5, on pages 22, 23, 24.

[X] Pre-Loaded Ball Joints

Equipment: Dial indicator, swivel and clamp. Floor jack, safety stand, pry bar.

Procedure: Using the same procedure as above, inspect for ball joint movement relative to its socket. These ball joints (marked "(b)" in Table 1 & 2, on page 22 & 23) are preloaded by rubber or springs under load (or compression), and should have very little movement in a vertical direction – no more than specified in tables.

Reject Vehicle: If vertical movement exceeds values specified in Tables 1 and 2.



RAISING POSITIONS FOR SUSPENSION SYSTEMS

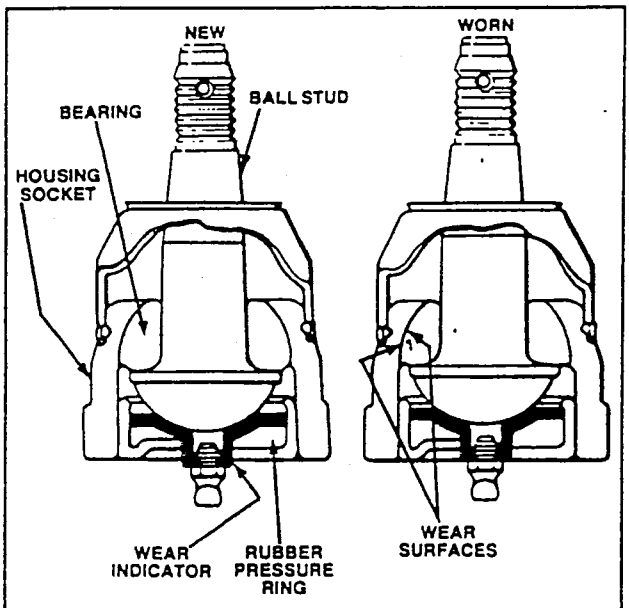
NOTE: *In checking for vertical motion of ball joints, keep in mind that the load carrying joint is unloaded, and that a pry bar pressure sufficient only to lift the weight of the wheel assembly is required. If the inspector uses the "leverage" of a pry bar to exert excessive pressure, he can easily "force" an apparent ball joint movement and get a false reading. This may result in expensive replacement of perfectly good joints.*

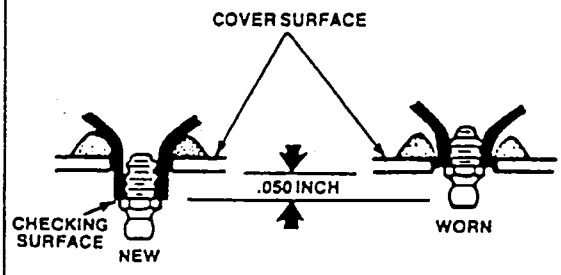
Ball Joint Wear continued

[X] Ball Joints With Wear Indicators

Procedure: Support vehicle with ball joints loaded (in normal driving attitude). Wipe grease fitting and checking surface free of dirt and grease. Determine if checking surface extends beyond the surface of the ball joint cover.

Reject Vehicle: If checking surface is flush with or inside the cover surface.





BALL JOINT WEAR INDICATOR

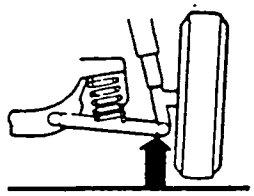
Wear is indicated by the protrusion of the ½" diameter boss, (exaggerated for illustration) into which the grease fitting is threaded for greaseable ball joints. This same boss exists and should be used to indicate wear in non-greaseable ball joints. This round boss projects .050" beyond the surface of the ball joint cover on a new, unworn joint.

To inspect for wear, support vehicle by wheels so that the lower ball joints are in a loaded condition. Wipe the grease fitting or boss free of dirt and grease. Observe or scrape a scale, screwdriver or fingernail across the cover. If the grease fitting boss is flush or inside the cover surface reject vehicle.

[X] Ford Motor Company
Fairmont & Zephyr (1978-1983)
Mustang & Capri (1979-Present)
Lincoln & Mark (1980-Present)
Continental (1982-1987)
Granada (1981-1982)
LTD & Marquis (1983-Present)

Procedure: These models have a new wear-indicating single lower ball joint system. Support the vehicle in normal driving position, with both ball joints loaded. Inspect using same procedure as ball joints with wear indicators.

Reject Vehicle: If checking surface is inside the ball joint cover.



SELECTED FORD – LOWER BALL JOINT

Ball Joint Wear (continued)

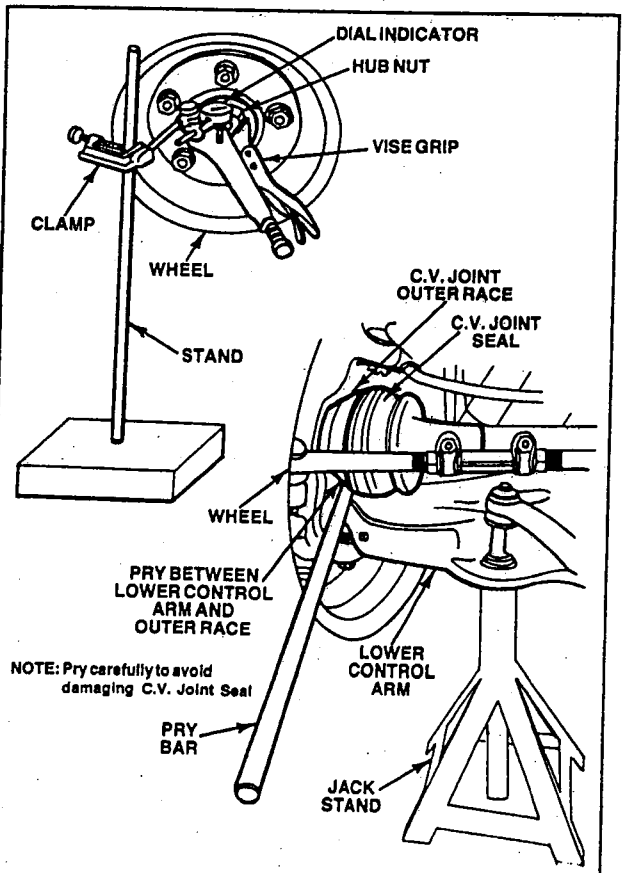
[X] Cadillac Eldorado, Buick Riviera and Oldsmobile Toronado (1979-1985) Cadillac Seville (1980-1985)

Equipment: Dial indicator, swivel, clamp, and stand. Floor jack or hoist, jack stand, pry bar, and vise grips.

Procedure:

- Support the vehicle under the lower control arm to unload the lower ball joint.
- Attach and lock vise grips to the hub nut and position the dial indicator on its stand with the dial indicator plunger tip against the vise grip.
- Position a pry bar on the top of the lower control arm with the bar tip under the outer race of the constant velocity joint and attempt to raise and lower the hub assembly. (Caution should be used so boot is not damaged).
- Observe the movement between the lower control arm and the outer race on the dial indicator.

Reject Vehicle: If vertical movement exceeds .125 inch (3.2mm).



GM - ELDORADO, RIVIERA, SEVILLE AND TORONADO LOWER BALL JOINT

[X] GM Transverse Engine Front Wheel Drive Vehicles

Equipment: Floor jack or hoist, and jack stand.

Procedure:

- Support the vehicle positioning lift or jack under cradle.
- Grasp wheel at top and bottom and shake top of wheel in an "in and out" motion. Observe for any movement of the steering knuckle relative to the control arm. This visual observation is necessary to avoid confusion with other conditions such as loose wheel bearings.

Reject Vehicle: If ball joint shows any movement.

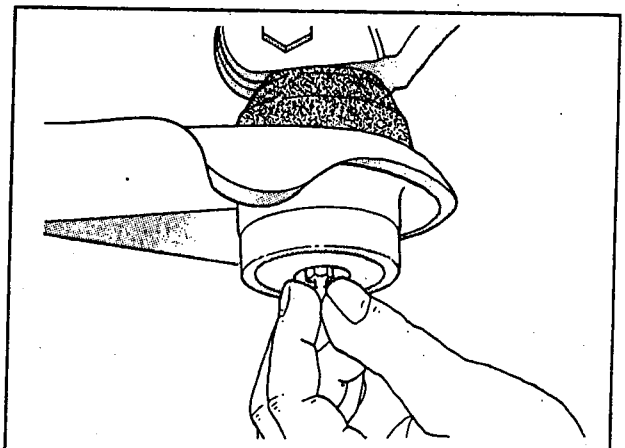
NOTE: *Ball joint is internally spring loaded.*

[X] Chrysler Frontwheel Drive Vehicles (Lower Only)

Procedure:

- With the weight of the vehicle resting on the road wheels, grasp the grease fitting as shown below and attempt to move fitting. No mechanical assistance or added force is necessary.

Reject Vehicle: If grease fitting shows any movement.



CHRYSLER FRONTWHEEL DRIVE LOWER BALL JOINT

[X] Chrysler - Upper Ball Joint

Procedure:

- Position jack under the lower control arm and raise wheel clear of floor.
- Lower jack to allow tire to lightly contact floor (most of vehicle weight relieved from the tire). It is important that the tire have contact with the floor.
- Grasp the top of the tire and apply force, in and outward. While this force is being applied, an observer checks for any movement at the ball joints between the upper control arm and the knuckle.

Reject Vehicle: If any lateral movement is evident.

BALL JOINT WEAR TABLES

Domestic And Captive Imports*

Table 1 - Manufacturer's Tolerance For Ball Joint Wear With Spring Or Torsion Bar On Lower Control Arm

Model	Year	Vertical Movement	Horizontal Movement
AMERICAN MOTORS			
All Models	62-88	See Table 2	See Table 2
BUICK			
All models except listed	57-60	.150"	(a)
	61-70	.100"	(a)
	71-72	.020"(b)	(a)
	73-82	Wear Ind.	(a)
	82-90	.000	.000
Apollo	1974	.0625"	(a)
Century	1981	.020"(b)	(a)
Century, Regal	1973	.020"(b)	(a)
LeSabre, Wildcat Electra, Centurion	73-88	Wear Ind.	(a)
LeSabre, Electra Estate Wagon	88-90	(c)	.125"
Opel	74-75	.080"	(a)
	76-79	.040"	(a)
Regal	74-90	Wear Ind.	.000
Riviera	79-85	.125"(d)	(a)
Skylark	80-88	.000	(a)
Special	61-63	.080"	(a)
	64-68	.060"	(a)
Special, Skylark, GS, Sport Wagon	69-70	.070"	(a)
	71-72	.0625"	(a)
CADILLAC			
All models except listed	82-88	.000	.000
Calais, DeVille (RWD) Fleetwood (RWD)	57-73	.062"	(a)
	74-88	Wear Ind.	(a)
Eldorado	67-78	.125"	(a)
	79-85	.125"(d)	(a)
Seville	76-80	Wear Ind.	(a)
	80-85	.125"(d)	(a)
CHEVROLET			
All models except listed	55-63	.093"	.250"
	64-70	.060"	.250"
	71-72	.020"(b)	(a)
	73-81	Wear Ind.	(a)
	82-90	.000	.000
Beretta	87-90	.000	.000
Biscayne, Bel Air, Impala, Caprice	73-90	Wear Ind.	(a)
Camaro	70-73	.020"(b)	(a)
	74-90	Wear Ind.	(a)
Chevette	76-87	Wear Ind.	(a)
Chevy II	62-67	See Table 2	See Table 2
Citation	80-85	.000	.000
Corsica	87-90	.000	.000
Corvair	60-63	.093"	(a)
	64-69	.060"	(a)
Corvette	55-63	Not Applicable	-
	71-82	.060"	(a)
	84-90	Wear Ind.	(a)
Chevrolet Continued			
Deluxe, Malibu, Monte Carlo, Laguna	71-72	.0625"	(a)
	1973	.020"(b)	(a)
	74-84	Wear Ind.	(a)
Nova	71-74	.0625"	(a)
Vega	71-74	.0625"	(a)
CHRYSLER			
All models except listed	57-64	.050"	(a&g)
	65-73	.070"	(a&g)
	74-76	.020"(b)	(a&g)
	77-88	.030"(b)	(a&g)
E Class, LeBaron, New Yorker	82-90	See Table 2	See Table 2
Imperial	57-66	.050"	(a&g)
	67-75	.020"(b)	(a&g)
Laser	84-86	See Table 2	See Table 2
DODGE			
All models except listed	57-67	.050"	(a&g)
	68-73	.070"	(a&g)
	74-76	.020"(b)	(a&g)
	77-87	.030"(b)	(a&g)
Aries, 400, 600, LE	81-89	See Table 2	See Table 2
Caravan	84-90	See Table 2	See Table 2
Challenger	70-73	.070"	(a&g)
Dart	60-67	.050"	(a&g)
	68-76	.070"	(a&g)
Polara	1973	.070"	(a&g)
Omni, Charger	78-90	See Table 2	See Table 2
Daytona	84-90	See Table 2	See Table 2
Lancer	85-89	See Table 2	See Table 2
Shadow	87-90	See Table 2	See Table 2
Dynasty	88-90	See Table 2	See Table 2
Spirit	89-90	See Table 2	See Table 2
FORD			
All models thru '79 except listed	54-79	(c)	.250"(6mm)
Edsel	58-60	-	-
Fairlane	62-70	See Table 2	See Table 2
Fairmont	78-83	Wear Ind.	(a)
Falcon	60-70	See Table 2	See Table 2
Festiva	88-90	No Play	No Play
Granada	75-80	See Table 2	See Table 2
	81-82	Wear Ind.	(a)
Ford Crown Victoria	79-90	Wear Ind.	(a)
LTD	83-86	Wear Ind.	(a)
Maverick	68-77	See Table 2	See Table 2
Mustang	65-78	See Table 2	See Table 2
	79-90	Wear Ind.	(a)
Thunderbird	61-66	See Table 2	See Table 2
	80-88	Wear Ind.	(a)
	89-90	(c)	No Play
Torino	68-71	See Table 2	See Table 2
LINCOLN			
All models thru '79 except listed	52-79	(c)	.250"(6mm)
Continental	82-87	Wear Ind.	(a)
Lincoln	80-90	Wear Ind.	(a)
Mark	80-90	Wear Ind.	(a)
Versailles	77-79	See Table 2	See Table 2
MERCURY			
All models thru '79 except listed	52-79	(c)	.250"(6mm)
Capri	79-86	Wear Ind.	(a)
Capri	1991	No Play	No Play
Comet	60-77	See Table 2	See Table 2
Cougar	67-79	See Table 2	See Table 2
	83-88	Wear Ind.	(a)
	89-90	(c)	No Play
LN7	81-86	No Play	No Play
Lynx	81-87	No Play	No Play
Grand Marquis	79-90	Wear Ind.	(a)
Marquis	83-86	Wear Ind.	(a)
Meteor	62-63	See Table 2	See Table 2
Monarch	75-80	See Table 2	See Table 2
Montego	68-71	See Table 2	See Table 2
Tracer	89-90	No Play	No Play
Zephyr	78-83	Wear Ind.	(a)
XY-7	80-82	Wear Ind.	(a)
MERKUR			
Scorpio	1988	-	-
XR4Ti	86-88	-	-

(continued)

Ball Joint Wear Tables Domestic And Captive Imports continued

Model	Year	Vertical Movement	Horizontal Movement
OLDSMOBILE			
All models except listed	57-70	.125"	(a)
	71-72	.020"(b)	(a)
	73-81	Wear Ind.	(a)
	82-90	.000	.000
Cutlass (FWD)	82-87	.000	.000
Cutlass (RWD), F85, Custom Cruiser	61-63	.090"	(a)
	64-70	.125"	(a)
	71-72	.0625"	(a)
	1973	.020"(b)	(a)
	74-88	Wear Ind.	(a)
Eighty-Eight	74-85	Wear Ind.	(a)
Ninety-Eight (RWD)	74-84	Wear Ind.	(a)
Omega	73-74	.0625"	(a)
	80-84	.000	.000
Toronado	66-78	.125"	.(a)
	79-85	.125"(d)	(a)
PLYMOUTH			
All models except listed	57-67	.050"	(a&g)
	68-73	.070"	(a&g)
	74-76	.020"(b)	(a&g)
	77-86	.030"(b)	(a&g)
Barracuda, Duster, Valiant	60-67	.050"	(a&g)
	68-76	.070"	(a)
Caravelle	85-87	.020"(b)	See Table 2
Colt	71-72	.020"(b)	(a)
Cricket	71-72	.070"	(a)
Fury	1973	See Table 2	(a&g)
Horizon, Turismo	78-90	See Table 2	See Table 2
Reliant	81-89	See Table 2	See Table 2
Sundance	87-90	See Table 2	See Table 2
Voyager	84-90	See Table 2	See Table 2
Acclaim	89-90	See Table 2	See Table 2
PONTIAC			
All models except listed	58-64	.060"	(a)
	65-70	.050"	(a)
	71-72	.020"(b)	(a)
	73-81	Wear Ind.	(a)
	82-85	.000	.000
Bonneville, Parisienne	74-90	Wear Ind.	(a)
Fiero	86-88		
	(front)	Wear Ind.	(a)
	(rear)	.000	.000
Firebird	71-73	.020"(b)	(a)
	74-90	Wear Ind.	(a)
Grand Am, Grand Prix, LeMans (Bonneville)	70-72	.0625"	(a)
	1973	.202"(b)	(a)
	74-90	Wear Ind.	(a)
LeMans (Tempest)	65-69	.050"	(a)
Phoenix	82-85	.000	.000
Tempest	61-63	.093"	.250"
	1964	.060"	.250"
Ventura	71-74	.0625"	(a)

* Captive Imports are passenger cars imported by license agreements with U.S. Motor Vehicle Manufacturers and sold thru domestic dealership.

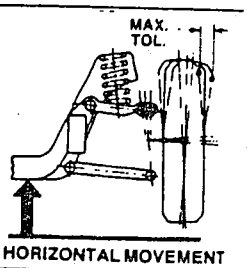
NOTE: Vehicles with wear indicating ball joints – inspect with ball joint loaded.

(a) Do not test ball joints by horizontal movement.
(b) Preloaded by rubber or sprins.
(c) Do not test joints vertically. Check horizonal movement only using dial indicator.

Table 2- Manufacturer's Tolerances For Ball Joint Wear With Spring Or Torsion Bar On Upper Arm And McPherson Strut Suspension

Model	Year	Vertical Movement	Horizontal Movement
AMERICAN MOTORS			
All models except Pacer	62-69	No Upper	Ball Joint(g)
	70-80	.080"	.160"(e)
	81-88	(c)(f)	.160"(e)
CHEVROLET			
Chevy II	62-63	.093"	(a)
	64-67	.060"	.250"
CHRYSLER			
E-Class, LeBaron, New Yorker	82-90	.000	(a)
Laser	84-86	.000	(a)
DODGE			
Aries	1980	.050"	(a)
Aries 400, 600	81-89	.000	(a)
Caravan	84-90	.000	(a)
Omni	78-80	.050"	(a)
Omni, Charger	81-90	.000	(a)
Daytona	84-90	.000	(a)
Lancer	85-89	.000	(a)
Shadow	87-90	.000	(a)
Dynasty	88-90	.000	(a)
Spirit	89-90	.000	(a)
Monaco	1990	.000	.000
EAGLE			
Premier	88-90	.000	.000
Medallion	1989	.000	.000
FORD			
Escort, EXP	81-90	No Play	No Play
Fairlane	62-70	(c)	.250"(6mm)
Falcon	60-70	(c)	.250"(6mm)
Granada	75-80	(c)	No Play
Maverick	68-77	(c)	.250"(6mm)
Mustang	65-78	(c)	.250"(6mm)
Thunderbird	61-66	(c)	.260"(6mm)
Probe	89-90	No Play	No Play
Torino	68-79	(c)	.250"(6mm)
Taurus	86-90	No Play	No Play
Tempo	83-90	No Play	No Play
LINCOLN			
Versailles	77-79	(c)	No Play
Continental (FWD)	88-89	No Play	No Play
MERCURY			
Comet	60-74	(c)	.250"(6mm)
Cougar	67-79	(c)	.260"(6mm)
Meteor	62-66	(c)	.250"(6mm)
Monarch	75-80	(c)	No Play
Sable	86-90	No Play	No Play
Topaz	83-90	No Play	No Play
PLYMOUTH			
Horizon	78-80	.050"	(a)
Horizon, Turismo	81-90	.000	(a)
Reliant	1980	.050"	(a)
	81-89	.000	(a)
Voyager	84-90	.000	(a)
Sundance	87-90	.000	(a)
Acclaim	89-90	.000	(a)

(d) Measured at drive axle nut.
(e) Horizontal movement tests for American Motors cars from 1970 thru 1986 excluding Pacer. Play should be measured at outside wheel rim and not at the ball joint. See drawing at right for proper placement of dial indicator.
(f) No play allowed on lower ball joint.
(g) See inspection procedure Chrysler Upper Ball Joint.



HORIZONTAL MOVEMENT

Ball Joint Wear Tables continued

Imports

Table 3 - Manufacturer's Tolerances For Ball Joint Wear With Spring Or Torsion Bar On Lower Control Arm

Model	Year	Vertical Movement	Horizontal Movement
ACURA			
All models	86-89	Do Not Test	Do Not Test
ALFA ROMEO			
All Models	57-86	.060"	Do Not Test
BMW			
All Models Except Indicated	75-89	1.4mm	Do Not Test
318i	84-85	1.0mm	Do Not Test
325i	84-89	1.0mm	Do Not Test
735i, 750i	87-89	1.0mm	Do Not Test
Honda			
Civic & CRX	84-89	Do Not Test	Do Not Test
Accord	86-89	Do Not Test	Do Not Test
Prelude	83-89	Do Not Test	Do Not Test
ISUZU			
"I Mark" (RWD)	81-85	.040"	Do Not Test
Impulse	83-89	.040"	Do Not Test
JAGUAR			
All Models	72-87	.060"	.040"
All Models	1988	.006	.007
MITSUBISHI			
Montero	Thru 88	.020"	Do Not Test
Van/Wagon	1988	None	None
Truck	1988	.02"	Do Not Test
RENAULT			
R-5/LeCar	76-77	.200"	.200"
ROLLS ROYCE			
All Models	67-88	None	None
TOYOTA			
Supra	Thru 89	.012(lower)	None
Truck & 4 Runner	Thru 89	.091(w/o load)	None
Celica	86-87	None	None
Camry	86-87	None	None
Starlet	81-84	None	None
VOLVO (i)			
All Models Except Indicated	Thru 88	3mm	Do Not Test
140, 164, (with spring joint)	Thru 88	5mm	Do Not Test

* Information for Foreign manufacturers was furnished by Automotive Importers Of America, Inc. (AIA) and is limited to models represented by their membership.

(h)

Criteria of Mazda Model Ball Joints			
Model	Year	Criteria Pounds	Test
GLC	81-85	63-109 lbs.	*1
GLC Wagon	81-86	0.88 lbs. or more	*2
RX-7	81-85	0.88 lbs. or more	*2
	86-88	4.4-7.7 lbs.	*3
323	86-88	1.8-3.1 N·m	*3
626	83-88	4.4-7.7 lbs.	*3
929	1988	1.1-2.6 lbs.	*3
B2000	86-87	40 lbs. or less	*3
B2200	87-88	4.4-7.7 lbs.	*3
B2600	87-88	4.4-7.7 lbs.	*3

*1: Measure the turning force at the end of ball joint arm by using a pull scale.
*2: Measure the turning force at the end of knuckle arm by using a pull scale.
*3: Install the Mazda special tool to the ball stud, and then measure by using a pull scale.

Table 4 - Manufacturer's Tolerances For Ball Joint Wear With MacPherson Strut On Lower Control Arm

Model	Year	Vertical Movement	Horizontal Movement
DATSUN/NISSAN (l)			
All Models Except Indicated	68-88	.040"	None
B210	74-78	.012"	None
F10, 310, Sentra, Pulsar	76-88	.060"	None
Stanza (except Wgn.)	82-88	.080"	None
HONDA			
Civic	Thru 83	.020"	Do Not Test
Accord	Thru 85	.020"	Do Not Test
Prelude	Thru 82	.020"	Do Not Test
ISUZU			
I-Mark (FWD)	85-89	.040"	Do Not Test
MAZDA			
All Models	81-88	(h)	(h)
MITSUBISHI			
Starion	Thru 88	None	None
Galant	Thru 88	None	None
Mirage	Thru 88	None	None
Cordia/Tredia	Thru 88	None	None
PEUGEOT			
All Models	66-88	None	None
ROVER			
3500	1981	None	None
SAAB			
9000	86-88	None	None
SUBARU			
All Models	73-84	Do Not Test	Do Not Test
All Models (Except Justy)	85-89	.012"	Do Not Test
Justy	87-89	.016"	Do Not Test
TOYOTA (l)			
Celica	Thru 89	None	None
Corolla (RWD)	Thru 87	.098"	None
Corolla (FWD)	Thru 89	None	None
Cressida	Thru 89	.098"	None
Tercel	Thru 89	None	None
MR 2	Thru 89	None	None
Camry	Thru 89	None	None
Starlet	81-84	None	None
VOLKSWAGEN (k)			
All Models	78-89	Do Not Test	Do Not Test
VOLVO (k)			
240, 260, 760	Thru 88	3mm	Do Not Test

Table 5 - Manufacturer's Tolerances For Ball Joint Wear With Spring Or Torsion Bar On Upper Arm

Model	Year	Vertical Movement	Horizontal Movement
CITROEN			
All Models	Thru 85	None	None
MAZDA (l)			
B2000	Thru 85	(h)	(h)
RENAULT			
Gordini, R-12, 15, 17	Thru 77	.200	.200
Gordini	78-79	.040	.040
SAAB			
99,900	Thru 88	None	None
TOYOTA			
Van	Thru 89	.091(w o load)	None

(i) Check vertical ball joint movement with ball joints fully loaded. With vehicle resting on all wheels, use a pry bar or similar leverage to apply vertical force to lower control arm at ball joint and observe play on properly attached dial indicator.
(j) To be measured at ball joint. Use .090" maximum tolerance if measured at tire sidewall (includes wheel bearing clearance).
(k) Ball joints with damaged boots shall be replaced.