

**STATE OF CALIFORNIA**

Department of Rehabilitation

**SPECIFICATIONS  
FOR  
ADAPTIVE DRIVING  
EQUIPMENT**

2013 REVISION

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## SPECIFICATIONS FOR ADAPTIVE DRIVING EQUIPMENT

2013 REVISION

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**1. Scope and General Specifications**

1.1 Scope

1.1.1 The specifications set forth in this document apply to all vehicular equipment and modifications purchased by the Department of Rehabilitation under a contract with a vehicle modifier.

1.1.2 The purpose of this document is to specify the practices and techniques in equipment design, fabrication, installation, or modification which will be accepted by the Department of Rehabilitation and its Designated Inspectors for purchase for consumers of the Department of Rehabilitation.

1.1.2.1 The Department of Rehabilitation's designated inspectors must inspect all work done by the vehicle modifiers as described in the Recommended Modifications and Supplemental Reports and refuse to approve payment for any work which is poorly designed, fabricated, installed, or fit, in addition to any work or equipment not in compliance with the specifications stated in this document.

1.1.2.2 These specifications are not intended to discourage new devices, techniques, or equipment, but to assure that consumers of the Department of Rehabilitation be provided equipment which is functional, safe, and durable.

1.1.2.2.1 All specifications can be waived, if necessary, (unless such waiver would violate state or federal regulations). Subsequent to a written request, the Rehabilitation Engineer must initiate all waivers of these specifications. The waiver would be based upon written approval from the Rehabilitation Engineer. Waivers on modifications to State owned vehicles require written concurrence from the Assistant Chief, Office of Fleet Administration.

1.1.2.2.2 Equipment and concepts not discussed in these specifications may be permitted under specific conditions. They may be subject to prior acceptance or rejection depending upon their merit. The vehicle modifier should discuss such atypical equipment and concepts with the Rehabilitation Engineer prior to including them in bids. The Rehabilitation Engineer, (with written concurrence from the Assistant Chief, Office of Fleet Administration on State owned vehicles) must make the final decision concerning the acceptance for purchase of the new equipment or concepts when such a decision is needed. The decision may result in a Change Bulletin issued by the Rehabilitation Engineer, and sent to certified driving evaluators, designated inspectors and vehicle modifiers with contracts with the Department of Rehabilitation, and will remain in effect until retracted or until the next change in the specifications.

## 1.2 General Specifications

1.2.1 The process of accepting an installed product (lift, hand control, etc.) for purchase if called for in this document will normally be conducted by the Rehabilitation Engineer working with the manufacturer of the product if it is an installed product (lift, hand control etc.) If the vehicle modifier is responsible for the design and/or fabrication of the product, the acceptance procedures will be conducted with the vehicle modifier contracted for the modification. If the vehicle modifier is subcontracting the modification or purchasing plans for the modification from a third party, the acceptance procedure will be conducted with the source of the product or information.

1.2.1.1 The manufacturer/modifier must provide documentation of compliance with these specifications or relevant FMVSS or other standards to the Rehabilitation Engineer in the form of an installation protocol and test data reflecting compliance with applicable standards or specifications set forth in this document. All documentation of

compliance will be maintained by the Rehabilitation Engineer.  
All such documentation must be sent to:

Rehabilitation Engineer  
State of California  
Department of Rehabilitation  
Mobility Evaluation Program  
5140 Florence Ave.  
Bell, CA 90201

1.2.1.2 If the manufacturer/modifier has tested the product or method of installation per the criteria specified in this document and received certification from the original vehicle manufacturer, the National Mobility Equipment Dealer's Association (NMEDA), an agency of the State of California or the Federal Government, or if an applicable standard requires only self certification, documentation of that certification must be presented. If such certification is not available, the installation protocol and test data called for in the applicable sections of this document must be provided as specified.

1.2.1.3 The Rehabilitation Engineer will review the material and determine if it meets these specifications. In some cases the Rehabilitation Engineer will arrange a review of the equipment with Fleet Administration.

1.2.1.4 The Rehabilitation Engineer will, with written concurrence from the Asst. Chief of Fleet Administration, notify the manufacturer/modifier in writing of the results of the review within 30 days of the review.

1.2.1.5 If a product is accepted for purchase, the Rehabilitation Engineer must notify Certified Evaluators, Designated Inspectors and Contract Vehicle Modifiers of the acceptance within 30 days of the acceptance.

1.2.2 Acceptance for purchase of any manufacturer's product, whether fabricated by a vehicle modifier or distributed from a centralized manufacturer, for consumers of the Department of Rehabilitation, based upon any procedure or criteria specified in this document can be suspended and/or revoked.

1.2.2.1. The Rehabilitation Engineer, with written concurrence of the Asst. Chief of Fleet Administration, must send the manufacturer/vehicle modifier written notice of the nature of the problem and offer the manufacturer/vehicle modifier 60 days to rectify the problem to the satisfaction of the Rehabilitation Engineer, with written concurrence of the Asst. Chief of Fleet Administration. The manufacturer's/vehicle modifier's receipt of the written notice of the problem must be confirmed by certified mail.

1.2.2.2. When consumer safety is a concern, the purchase of any product which has been previously accepted for purchase can be temporarily suspended by written notice from the Rehabilitation Engineer to the Asst. Chief of Fleet Administration and the manufacturer/vehicle modifier until the process outlined in section 1.2.1.1 above has been implemented and the manufacturer/vehicle modifier has the opportunity to respond.

1.2.2.3 If the Rehabilitation Engineer determines that the product has changed substantially from the product which was accepted for purchase, the Rehabilitation Engineer, with written concurrence from the Asst. Chief of Fleet Administration, may suspend the original acceptance of purchase.

1.2.2.3.1 The manufacture must be notified in writing of the suspension and the conditions for re-acceptance.

1.2.2.3.2 The process for re-acceptance of the product will be the same as for initial acceptance of that product as defined elsewhere in this document with the exception of any additional conditions noted in 1.2.2.3.1.

1.2.3 All components or devices installed as part of a vehicle modification must be installed per the manufacturer's specifications and instructions. Justifications for any deviations must be noted in writing to the Rehabilitation Engineer prior to the inspection by the designated inspector and must be approved in writing by the Rehabilitation Engineer prior to the time of the vehicle inspection. That justification must normally include written agreement from the manufacturer for that deviation. Installation manuals must be

available for use by the designated inspectors at any time during an inspection.

1.2.4 Products installed, which are not required to be accepted for purchase by the process in 1.2.1 above, must meet certain standards (such as Federal Motor Vehicle Safety Standards). For those products the vehicle modifier must be prepared to delineate the path to compliance for the Designated Inspector via documentation and demonstration.

1.2.5 Modifications must not be made to vehicles with existing modifications which do not meet the specifications of this document without the written approval of the Rehabilitation Engineer with the written concurrence of the Asst. Chief of Fleet Administration (in the case of State owned vehicles). Exceptions may be made when the vehicle was previously modified, inspected and accepted under an earlier version of these specifications. New modifications to these older vehicles must, however, meet these specifications.

1.2.6 All modifications installed must be new unless explicitly indicated in the bid and accepted, in writing, as such by the Rehabilitation Engineer and found in compliance with the remainder of this document by the Designated Inspector.

## 2. Reference Documents

- 2.1 Vehicle modifications must comply with the following:
  - 2.1.1 California Vehicle Code, California Code of Regulations, Title 13 (Motor Vehicles)
  - 2.1.2 Federal Motor Vehicle Safety Standards except for those parts exempted per 49 CFR Part 595, "Exemptions from the Make Inoperative Prohibition; Final Rule".
  - 2.1.3 Federal Motor Vehicle Safety Standard 571.403 – Platform lift systems for motor vehicles. Federal Register Vol. 67, No. 249/Friday, December 27, 2002, p. 79439.
  - 2.1.4 Federal Motor Vehicle Safety Standard 571.404 – Platform lift installations in motor vehicles. Federal Register Vol. 67, No. 249/Friday, December 27, 2002, p. 79451.
  
- 2.2 Other relevant documents.
  - 2.2.1 Veterans Administration criteria for lift systems - Federal Register Vol. 43, No. 96, p. 21390.
  - 2.2.2 .Veterans Administration criteria for hand controls - VAPC-A-7505-8 which is in Program Guide, Prosthetic and Sensory Aids Service M-Z, Part IXZ, G9, Veterans Administration, Washington, D.C. 20420, March 31, 1978.
  - 2.2.3 Society of Automotive Engineers Standard J1903, July 31, 1997, Automotive Adaptive Controls, Manual.
  - 2.2.4 Society of Automotive Engineers Standard - J1725, June, 1995, Structural Modifications for Personally Licensed Vehicles to meet the Transportation Needs of Persons with Disabilities.
  - 2.2.5 Society of Automotive Engineers Standard - J2092, November 1999, Testing of Wheelchair Lifts.
  - 2.2.6 Society of Automotive Engineers Standard - J2093, November 1999, Design Considerations of Wheelchair Lifts.
  - 2.2.7 Society of Automotive Engineers Standard - J2095, May, 1995, Terminology.
  - 2.2.8 Society of Automotive Engineers Standard - J2249, Wheelchair Tiedown and Occupant Restraint Systems for Use in Motor Vehicles.
  - 2.2.9 Society of Automotive Engineers Standard - J2603 Recommended Practice for Powered Gas Brake Control Systems



2.2.10 Society of Automotive Engineers Standard - J2604  
Recommended Test Procedure for Powered Gas Brake Control  
Systems

2.2.11 Society of Automotive Engineers Standard - J2388 Secondary  
Control Modifications

**3. Definitions and Roles** (The definitions and roles described below are for information in the context of this document only. The roles of the individuals are defined by State of California and regulations and directives of the Department of Rehabilitation.)

**Backup System** - A reserve or substitute source of energy in the event of a failure in the primary equipment.

**Body Raise** - A method of lowering the floor over 3 1/2 inches (the nominal distance between the OEM floor and frame). The body of the van is raised and spacers are placed between the frame (actually, the noise/vibration isolators) and the body to raise it far enough to avoid interference with the frame when the floor of the body is lowered.

**Change Bulletin** – A notice sent out by the Rehabilitation Engineer, with the concurrence of the Assistant Chief of Fleet Administration, describing a revision to the Specifications for Adaptive Driving Equipment. The change bulletin is effective until rescinded or until the next revision of the Specifications for Adaptive Driving Equipment is released.

**Consumer** – An individual who is a user (and in other contexts, purchaser) of goods and services. In this document the term is specifically used to describe the user (either driver or passenger), with a disability, of the adaptive driving equipment discussed in this document. These clients of the Department of Rehabilitation are typically described as consumers since, while they may not be the purchaser of the goods and, they have input into the purchasing process and are users of the equipment.

**Contract Vehicle Modifier** - A vehicle modifier (see below for definition) which has a master contract with the Department of Rehabilitation which entitles them to bid on vehicle modifications for Department of Rehabilitation consumers.

**Cross Members** - Structural components between the parts of the body or parts of the frame, which stretch laterally across the vehicle.

**Designated Inspectors** - Designated Inspectors refers in this document to the individuals who are designated by the Department of Rehabilitation to inspect modified vehicles to assure that all authorized modifications have been completed and that these modifications comply with the Specifications for Adaptive Driving Equipment. Fleet Administration Inspectors inspect State owned vehicles (see below). Inspectors contracted by the Department of Rehabilitation inspect consumer owned vehicles. The vehicle modifiers cannot be paid without a successful inspection and approval of the completed modifications.

**Driving Evaluator** – Driving evaluation programs are organizations, whose responsibility is to evaluate a consumer’s ability to drive safely and independently, and to determine the consumer’s equipment needs. The staff of these programs will be referred to in this document as Driving Evaluators. The Department of Rehabilitation only uses driving evaluation programs it has certified. These driving evaluation programs are referred to in the Department of Rehabilitation regulations affecting modifications as Mobility Evaluation Programs.

**Drive Train** - Those components of the vehicle which generate power (engine), transform the power (transmission) and transmit the power (driveshaft, differential and axles).

**Federal Motor Vehicle Safety Standard (FMVSS)** – Standards written by the National Highway Traffic Safety Administration of the Federal Department of Transportation. They are normally focused only on OEM vehicles, but in 2001, the 49 CFR Part 595, “Exemptions from the Make Inoperative Prohibition; Final Rule” specified which portions of the standards would be exempted (thereby delineating which portions were still applicable) for entities modifying vehicles for use by people with disabilities. (While the standards are focused on OEM vehicles, they also state that no one should “make inoperative” any device installed in order to meet a FMVSS.) In 2005 the first standards went into effect which were aimed primarily at the industry modifying vehicles for consumers with disabilities.

**Frame Cut** - A method of lowering the floor over 4 inches (the nominal distance between the OEM floor and frame). The frame of the van is cut out to make room for the lowered floor, with reinforcement added to the frame to compensate for the amount of frame removed.

**Four Point Wheelchair Securement** - A device for securing the wheelchair in a vehicle. The term usually refers to a manual belt or strap type securement system where two straps attach to the back of the wheelchair and two to the front, with the opposite ends of all four straps attached to the vehicle floor.

**Fleet Administration** - Fleet Administration is a division of the Department of General Services which has the responsibility to inspect vehicles purchased by the State of California and modifications installed on those vehicles. Fleet Administration Inspectors approve the modifications of vehicles purchased for Department of Rehabilitation consumers based on the modifications meeting these Specifications for Adaptive Driving Equipment.

**Floor Lowering** - Cutting out the original van floor and replacing it with a new, floor which has been dropped several inches below the OEM floor level. It is usually done for proper visibility out the windows for a driver or passenger sitting in a wheelchair.

**Floor Lowering Depth** - The amount that the floor of the van is lowered relative to the OEM floor level.

**Gross Vehicle Weight Rating (GVWR)** – The maximum weight a complete vehicle is allowed to carry. It is the combined weight of the vehicle and its maximum allowable payload with all fluids full. It is determined by the manufacturer and cannot be changed by second stage manufacturers or vehicle modifiers. It should not be exceeded by the user.

**Hand Control** - A mechanical device that translates the operation of a control normally operated by the feet to hand operation by the addition of rods levers and/or other hardware.

**Incomplete Vehicle** — An assemblage consisting, as a minimum, of frame and chassis structure, powertrain, steering system, suspension system and braking system, to the extent that those systems are to be part of the completed vehicle, that requires further manufacturing operations, other than the addition of readily attachable components such as mirrors or tire and rim assemblies, or minor finishing operations, such as painting, to become a completed vehicle. It is sold by the manufacturer (either directly or through a dealer) to a modifier which will complete the vehicle then place a completed vehicle label on the door. Modifiers who can complete the incomplete vehicle must be registered with the National Highway Traffic Safety Administration. Manufacturers/dealers are not supposed to sell incomplete vehicles to anyone but qualified modifiers. Incomplete vehicles

cannot be registered to be driven on the road until they have been completed and have the completed vehicle label on the door.

**Kit** - The term used in this document to describe a group of parts manufactured and/or purchased by a manufacturer and assembled/packaged into a product which, when installed per the manufacturer's directions will allow some function of a vehicle to be better used by a driver with a disability.

**Manufacturer** – The term used in the context of this document to describe a business entity which designs and fabricates and/or assembles devices which are sold to vehicle modifiers for use in vehicles modified for drivers or passengers with a disability.

**May** - The term used whenever non compliance with the specification is permissible or an alternative is being presented.

**Must** - The term used whenever the criteria for compliance with the specification requires that there be no deviation.

**NMEDA** - National Mobility Equipment Dealers Association. The National Mobility Equipment Dealers Association is an organization comprised primarily of vehicle modifiers (which they call dealers). It was formed to allow vehicle modifiers to share information about vehicle modifications. It has evolved into many roles including a Quality Assurance Program (QAP) which requires members to meet specific standards. Included in those standards are all applicable Federal Motor Vehicle Safety Standards (FMVSS). They also crash test certain components of modified vehicles to assure compliance with FMVSS and sell the plans to members, which would provide a path to compliance for those standards.

**Non Unit Body** - A term used to describe a type of vehicle structure wherein the body is constructed as a separate entity from the frame. The body and frame are essentially bolted together, usually with some type of cushioning device to isolate sound and vibrations.

**Notch** - Removing or displacing a part of a vehicle component to make additional room for consumer access or function.

**Original Equipment Manufacturer (OEM)** – The term used in the context of this document to describe a business entity which designs the base vehicle on which modifications are made. Examples would be Ford Motor Company, General Motors, etc.

**Path to Compliance** – The manner in which a vehicle modifier achieves compliance with a specific standard. For example, the path to compliance with FMVSS 301 (Fuel System Integrity) for an aft of axle fuel system could be for the vehicle modifier to test an installed fuel system of his/her own design and fabrication, purchase a fuel system which had been tested by its manufacturer and install the fuel system per the manufacturer's instructions.

**Payload** - Gross vehicle weight rating (GVWR) minus the weight of the vehicle and the modifications.

**Powered Hand Control** - A hand control which uses an energy source (such as electric, hydraulic, vacuum, pneumatic, etc.) to supplement the force and motions made by the driver to control the accelerator and brake functions of a vehicle.

**Powered Parking Brake** - A motor or actuator to set and release the parking brake electrically.

**NHTSA** - National Highway Traffic Safety Administration, which is a part of the federal government's Department of Transportation.

**Reduced Effort Braking** - A modification that reduces the braking force to 7-11 foot-pounds.

**Reduced Effort Steering** - A steering system modification wherein the effort to steer the vehicle is reduced

**Rehabilitation Counselor** - The case manager for the consumer within the Department of Rehabilitation. The Rehabilitation Counselor works with the consumer towards achieving the consumer's vocational goals. The Rehabilitation Counselor authorizes the vehicle modifications and inspections.

**Rehabilitation Engineer** – An Engineer on the staff of the Department of Rehabilitation who, in addition to participating in driving evaluations, is available to Fleet Administration or other Department designated inspectors, consumers, rehabilitation counselors, vehicle modifiers, equipment manufacturers and evaluators for technical support. The Rehabilitation Engineer also writes and maintains this document.

**Remote Steering** - Steering controls which are designed to provide a steering input device alternative to the OEM steering wheel that either reduces the required input force, changes the required range of motion or changes the location of the steering control or any combination of the above. These controls supplement by power, other than by the driver's own muscular efforts, the force output of the driver.

**SAE** - Society of Automotive Engineers

**Secondary Controls** – Controls that operate some part of the vehicle other than the gas, brake or steering. Separate control consoles, switches or buttons must often be installed for use by drivers with disabilities who cannot reach or operate the OEM controls.

**Second Stage Manufacturers** – The term used in the context of this document to describe a business entity which modifies an OEM vehicle in a substantial manner, with specific models and options being offered. They operate through dealers and normally do not sell directly to consumers. Second stage manufacturers must be registered with National Highway Traffic Safety Administration.

**Shall** - Implies compliance is required; deviation is not permitted.

**Should** - Implies compliance is recommended; deviation is permitted.

**Suspension** - Those components of the vehicle which attach the wheels to the frame of the vehicle, allow for some compliance with rough terrain and usually contains the portion of the braking system which slows the wheels.

**Transfer Seat Base** - A powered seat base that provides additional travel to facilitate movement of the driver, with a disability, between the seat and a wheelchair. It moves further than an OEM power seat, and often incorporates a 90 degree swivel for vehicles with entry on the side of the vehicle.

**Terminal Device** - A handle or fixture which is part of a control system such as a hand control or steering system. The terminal device is the part which is held in or on the hand (or other appropriate extremity) of the user in order to operate the device. The shape of the terminal device may vary with the user, but typical terminal devices include straight handles, cuffs or a three post device called a tripin.

**Unit Body** - A term used to describe a type of vehicle structure where the body and frame are all designed as a single entity and the strength of the entire structure is dependent on the integrity of all components. Unlike the body on frame construction noted above, modifications to the body of this system can have severe adverse effects on overall structural integrity.

**Contracts and Procurement Section** – This Section of the Department of Rehabilitation, oversees granting contracts to vehicle modifiers, who must have contracts with the Department of Rehabilitation in order to bid on, and be authorized to complete, vehicle modifications. The contract, among other things, specifies compliance with these Specifications for Adaptive Driving Equipment as a condition of the contract. Contracts and

Procurement Section solicits and evaluates bids for modifications and (with approval from Fleet Administration) awards the bids to the modifiers. Contracts and Procurement Section also coordinates invoicing from the vehicle modifier.

**Vehicle Modifier** - A commercial enterprise which modifies vehicles for use by individuals with disabilities per the provisions of their contract with the Department of Rehabilitation. A vehicle modifier may design, fabricate and install devices into the modified vehicle or they may simply install devices sold to them by manufacturers. The result is a vehicle which has been custom modified to meet the needs of an individual with a disability.

**Wheelchair** – A wheeled seat for the support and conveyance of a person with a disability, comprising of at least a frame, seat and wheels.

**Wheelchair Hoist** – A device which raises and lowers an unoccupied wheelchair from the ground to a stowed position in or on a vehicle.

**Wheelchair Lift** – A device which raises and lowers a wheelchair from the ground to the vehicle floor. A wheelchair lift is usually intended to be used for an occupied wheelchair.

**Wheelchair Securement** – A system to control wheelchair movement in a moving vehicle,

## **4. Modifications for Access and Entry**

### **4.1 Locks and switches**

4.1.1 There must not be any sharp edges or burrs near the lock or switches.

4.1.2 All switches, switch boxes, and switch extensions must be securely attached.

4.1.3 All switches and locks (except exterior magnetic switches) must be permanently labeled as to function, order, and direction of use.

4.1.4 All exterior switches must be water resistant.

4.1.5 All switches for access and entry systems must be momentary, requiring constant pressure for operation unless the lift and door closing mechanisms incorporate pressure sensitive devices to avoid crushing and/or shear injuries to users and/or bystanders.

### **4.2 Powered doors**

4.2.1 When inside the van, there must not be any light showing around the doors from outside the van when the doors are in the full powered closed position.

4.2.2 There must not be any leaks into the van when the doors are sprayed with water from the outside with the doors in the full powered closed position.

4.2.3 Powered door openers must have a mechanical quick release in the event of mechanism or power failure. The emergency release must be clearly identified.

4.2.4 Powered doors must open and close between 4-8 seconds total.

4.2.5 Original equipment door latches (or latch mechanisms which comply with Federal Motor Vehicle Safety Standards 206) must be retained if a powered door opener is installed with a wheelchair lift which does not block the doorway.

4.2.5.1 If the latch is not OEM, the vehicle modifier must be able to provide documentation of compliance with FMVSS 206.

4.2.5.2 If the doors is equipped with a wheelchair lift that is linked to an alarm system consisting of either a flashing visible signal located in the driver's compartment or an alarm audible to the driver that is activated when the door is open, the latches need not conform to the remainder of FMVSS 206 (per FMVSS 206. S4(c))



## 4.3 Wheelchair Hoists.

### 4.3.1 Exterior Transport Hoists

#### 4.3.1.1 Rooftop (powered)

4.3.1.1.1 There must be an automatic shut off on each powered cycle of a car top wheelchair carrier which operates at the end of that cycle.

4.3.1.1.2 Car top wheelchair carriers must be installed in such a manner as to not cause the car roof to dent or flex over 1/8 inch. All roof mounting points must be sealed to prevent leakage into the vehicle interior.

4.3.1.1.3 All electrical wires from the car top wheelchair carrier must enter the car through properly sealed and grommeted holes. Wires must not pass over doorsills, around hood openings, or other areas in such a manner that constant movement of the vehicle part (e.g. door or hood) could cause chafing or flexing of the wires.

4.3.1.1.4 Control switch location must not interfere with the consumer's entry or exit (transfer) from the wheelchair to the driver's seat or vice versa.

4.3.1.1.5 In case of mechanical or electrical failure, a manual override must be available so the wheelchair can be removed from the device.

#### 4.3.1.2 Rear Exterior Platform or Jib Crane Hoists

4.3.1.2.1 Wheelchair hoists for the exterior rear of vehicles must only be mounted on vehicles where the combined weight of the wheelchair, hoist and hitch does not exceed the vehicle manufacturers recommended hitch tongue capacity of the vehicle. If the recommended hitch tongue capacity is not available, 10% of the vehicle's towing capacity may be used to determine the hitch tongue capacity.

4.3.1.2.2 Wheelchair hoists for the rear of vehicles must meet all California Vehicle Code requirements for visibility of tail lights, brake lights, and license plates (including license plate lights).

4.3.1.2.3 Air inflated shock absorbers or other changes to the vehicle's suspension, including changed springs

may be used to keep the loader from dragging on steep driveways etc. Changes other than shock absorbers must have the written approval of the Rehabilitation Engineer (with written concurrence of the Assistant Chief of Fleet Administration on State owned vehicles) prior the modification of the vehicle. (See 5.3.4)

4.3.1.2.4 Towing hitches installed to accommodate a wheelchair hoist must be those intended by the hitch manufacturer for the specific vehicle being modified and the hoist being installed. For example a Class 3 hitch required by a hoist may not be modified to fit a car for which only a Class 2 hitch is available.

#### 4.3.1.3 Interior Platform or Jib Crane Hoists

4.3.1.3.1 All wiring and connections must be appropriately insulated to avoid contact by the user or any hardware stored in the same area.

4.3.1.3.2 If the hoist is in the back of a truck, van or mini van, provisions must be made for securing the wheelchair in the event of an accident or sudden stop.

4.3.1.4 The weight of the interior or exterior hoist (including all attachment hardware, such as hitch carriers) and wheelchair, combined with the weight of 150 pounds at each seat belted position in the vehicle, must not exceed the payload of the vehicle

4.3.2 All floor ramps and platforms (installed in the back seat area of a car to assist in loading or unloading a wheelchair) must be fastened to prevent shifting while the wheelchair is being loaded. They may have a quick release to facilitate passengers riding in the rear seat.

4.3.3 The wheelchair hoist must be installed exactly per the manufacturer's installation instructions and recommendations, in the vehicles specified in the instructions, or have written approval from the manufacturer for any deviations from the manufacturers recommendations. A copy of the installation instructions must be available for the designated inspector.

#### 4.4 Wheelchair Lifts

4.4.1 Wheelchair Lifts manufactured after April 1, 2005 must comply with FMVSS 403 "Platform lift systems for motor vehicles" and lift installations must comply with FMVSS 404 "Platform lift installations

- in motor vehicles.” The vehicle modifier must have available information documenting the compliance of the lift with FMVSS 403 and the installation with FMVSS 404. (Note: Lifts manufactured before April 1, 2005 may be installed on vehicles modified after first sale as long as they are available or moved to another vehicle.)
- 4.4.2 The wheelchair lift must be installed exactly per the manufacturer’s installation instructions and recommendations, in the vehicles specified in the instructions, or have written approval from the manufacturer for any deviations from the manufacturers recommendations. A copy of the installation instructions must be available for the designated inspector. (Note: Lifts which comply with FMVSS 403 which are installed on older vehicles without the features needed to support compliance (e.g. interlocks between brakes and shifting) need not comply with the specifications which the vehicle does not support.)
- 4.4.3 Armrests on captains seats must be checked for clearance in any position (especially folded up) from any moving parts of side mount lifts.
- 4.4.4 Wheelchair lifts must not place stresses on the wheelchair, other than those designed by the wheelchair manufacturer.
- 4.4.5 An overhead van interior light located within two feet of the door opening and a separate light illuminating the entry to the vehicle and the area where the lift platform will rest in the lowest position must operate when the van door housing the lift is open.
- 4.4.6 Suspension or drive train modification changes must not be made in association with the installation of a lift. (See 5.3)
- 4.5 Floor leveling of an otherwise non-modified floor.
- 4.5.1 Floor leveling must be strong enough so that a 500 lb. combination of consumer and wheelchair does not sink into the corrugations in the floor and the floor must not be raised over ½” for leveling (not including carpet).
- 4.5.2 The floor leveling material must be securely fastened to prevent rattles.
- 4.5.3 All leveled floor areas must be covered with short pile (not shag) carpeting, or other suitable material, to provide a nonskid surface and thermal insulation.
- 4.5.4 Floor covering must not be glued down over any wiring, with the exception of threshold warning devices. (see 11.18).

4.6 Modifications must not be installed in a van in a way which would keep the consumer from turning his/her wheelchair around in the van in order to face the lift when exiting the van.

4.7 If a van which will be driven by a consumer does not have windows in the cargo area, additional windows, usually in the passenger side rear quarter, the passenger side cargo door, or on the driver's side wall just behind the driver's door may be recommended by the driving evaluator. These windows must be at least eighteen (18) inches high by eighteen (18) inches wide and the bottom of the window must be a maximum of twenty-eight (28) and a minimum of twenty-four (24) inches above the van floor..

#### 4.8 Notching Body Parts

4.8.1 Notched engine covers must not be used unless there is no other alternative.

4.8.2 Notched fender wells at the left front wheel of the van (for wheelchair foot plates) must not restrict travel of the left front van wheel in any position of turn or suspension excursion, or both, combined with the largest tires and wheels available for that vehicle from the original manufacturer.

4.8.3 Notched components must be completely rebuilt in their new location with OEM or equivalent materials. Notched areas must be completely sealed to protect the vehicle occupants from moisture, exhaust fumes, engine noise or air flow from the exterior of the vehicle.

#### 4.9 All vans must have the interior insulated for thermal protection.

4.9.1 If the van did not come with a finished interior from the factory, R-11 (or equivalent) insulation must be installed.

4.9.2 Paneling (to retain the insulation) must be included in the cost estimate whenever the van requires the installation of insulation.

4.9.3 All insulation and "paneling" materials must comply with FMVSS 302, Flammability of Interior Materials. The vehicle modifier must have available information documenting the compliance with FMVSS 302.

4.9.4 Insulation and paneling in cargo vans and other vehicles without a finished interior must have a means of fastening the paneling around windows and doors. The paneling edge must be covered and attached to the vehicle wall or window trim.

4.9.5 Insulation and paneling for an equivalent vehicle may be ordered from the OEM or may be aftermarket installed. If the Driving Evaluator recommendations include rear heat and air conditioning, all necessary ducts and outlets must be included in the paneling.

4.9.6 Aftermarket paneling must allow access to jacks and jack handles etc., at approximately the OEM locations.

## 5. Modifications to Vehicle Body and Structure (Non Unit Body Vehicles)

### 5.1 Extended doors.

5.1.1 Extended doors and door frames must be fabricated and braced in a manner consistent in strength to the original door and doorway.

5.1.2 Extended doors and door frames must have a weather seal equivalent to that on the original door. The fit between the extended door and the extended door frame must be equivalent to the fit of the original vehicle door and the original door frame.

5.1.3 Extended doors which comply with the NMEDA QAP Guidelines are acceptable. A copy of the relevant NMEDA QAP Guidelines must be available for use by the designated inspector.

### 5.2 Raised Roof.

5.2.1 Raised roofs (and reinforcement) are not allowed when added only because of carpeting and/or padding over 1/2 inch thick.

5.2.2 There must not be any leaks at the joint between the raised roof and the original body when sprayed with a low pressure water hose. Sealant must be used around the entire top/body joint and on every hole made into the top and the vehicle before fasteners are inserted as well as after the top has been installed.

5.2.3 There must not be any water collection points in locations such as "eyebrows" over side doors which could later leak or rust.

5.2.4 Structural reinforcement - Any van which has had the factory top removed must have structural reinforcement added to compensate for the reduced structural rigidity.

5.2.4.1 This structure must be designed and installed primarily to restore rigidity to the van body.

5.2.4.2 The lateral tubes in this reinforcement must be such that:

5.2.4.2.1 The tubes must be of metal and a minimum of 1-1/2" by 2-1/2" rectangular tubing with 11 gauge (1/8") wall thickness.

5.2.4.2.2 A minimum of two cross tubes separated by a minimum of three feet and held apart by at least one tube of similar cross section must be used.

5.2.4.2.3 Raised roofs with structural reinforcement which comply with the NMEDA QAP Guidelines are acceptable.

A copy of the relevant NMEDA QAP Guidelines must be available for use by the designated inspector.

5.2.4.3 A minimum of 1" X 1" header, with 11 gauge (1/8") wall thickness, must be installed along the top interior sides of the van to which the reinforcement is attached. The header must extend at least six (6) inches on either side of the structural reinforcement.

5.2.4.4 The following conditions must be observed when tops are extended over 12 inches.

5.2.4.4.1 Tops extended over 12 inches must be insulated to reduce the heat buildup in the van. The material must comply with FMVSS 302, Flammability of Interior Materials. The vehicle modifier must have available information documenting the compliance with FMVSS 302.

5.2.4.4.2 Tops extended over 12 inches must not be combined with body raises.

5.2.5 Raised roofs must not be combined with a body raise except with the written approval of the Rehabilitation Engineer (and with the written concurrence of the Asst. Chief of Fleet Administration on State owned vehicles). (See 5.3.4)

5.2.6 Raised roofs must comply with FMVSS 216, Roof Crush Resistance. The vehicle modifier must have available information documenting the compliance with FMVSS 216.

5.2.7 Raised roofs must have an interior shell to protect the occupants from the structural reinforcement. Raised roof interiors must comply with FMVSS 201, Occupant Protection in Interior Impact. Interior shells must comply with FMVSS 302, Flammability of Interior Materials. The vehicle modifier must have available information documenting the compliance with FMVSS 201 and 302.

5.2.8 All weldments must be free from weld splatter.

### 5.3 Floor Lowering of Non Unit Body Vehicles

5.3.1 Vehicle modifiers who lower floors of 2004 or later Non Unit Body Vehicles (e.g. Ford E van series and the Chevrolet and GMC G/H vans) must demonstrate a path to compliance with all applicable Federal Motor Vehicle Safety Standards and Regulations. All vehicle modifiers who plan to demonstrate a path to compliance with applicable Federal Motor Vehicle Safety Standards and Regulations

must submit the compliance data to the Rehabilitation Engineer at the address noted in 1.2.1.1 above to initiate the process of acceptance for purchase.

5.3.1.1 The compliance data must document that the vehicle modifier has been audited for a comprehensive Quality Control program (e.g. the modifier can document participation in the Ford Truck Quality Program or other such audits).

5.3.1.2 The compliance data must include test data to demonstrate compliance with the portions of Federal Motor Vehicle Safety Standards 101, 105, 106, 110, 135, 201, 204, 206, 207, 208, 209, 210, 301, and 302 which were not exempted by 49 CFR Part 595 (or evidence that the indicated FMVSS was not relevant to the modification) as well as an Exemption Order (EO) number from California Air Resources Board(CARB) for the year and model of the vehicle being modified.

5.3.1.3 The designated inspector can refer to an addendum to this document, the Discussions and Interpretations section, for modifiers whose documentation has been received and the modifications accepted for purchase.

5.3.2 Body raises must not be completed in combination with roof raises over 12 inches. Body raises in combination with roof raises under 12 inches must be accepted by written approval from the Rehabilitation Engineer, and (if the vehicle is State owned) with written concurrence from the Asst. Chief of Fleet Administration.(See 5.2.5) The vehicle modifier must have copy of that approval available for review by the designated inspector.

5.3.3 Regardless of the method (or combination of methods) used, floor lowering over six (6) inches must not be bid (nor completed) without the written approval of the Rehabilitation Engineer. The vehicle modifier must have copy of that approval available for review by the designated inspector.

5.3.4 Floor lowering must not affect the OEM designed operation of the air bags in the vehicle due to movement of significant portions of the air bag sensor system in a manner not accepted by the OEM.

5.3.5 Floor lowering must not affect the OEM designed operation of the safety belts in the vehicle.



5.3.6 Changes of any kind to a fuel system must not be made unless the vehicle modifier can provide documentation of compliance with FMVSS 301 and of meeting all California Air Resources Board (CARB) emission requirements. Documentation of an Executive Order number must be provided to the Rehabilitation Engineer at the address noted in 1.2.1.1 above. The designated inspector can refer to the addendum to this document, the Discussions and Interpretations section, for modifiers whose documentation has been received and the modification accepted for purchase.

5.3.7 The same path to compliance noted in 5.3.1 above (or reasons why the original path to compliance was not disrupted) must be demonstrated for power floor pans or raised floors on a vehicle which has already demonstrated a path to compliance.

5.4 Suspension changes must not be made to any vehicle for any reason, except where specifically allowed in this document.

5.5 If modifications are made to the vehicle which affect the storage of the spare tire. A safe, secure mounting of the spare tire must be provided as part of the modification. If the spare tire is mounted outside the vehicle, it may only be mounted on the rear doors and it must be covered for protection from the sun and protected from theft.

## **6.0 Modifications to Vehicle Body and Structure (Unit Body Vehicles)**

6.1 There must not be any structural modifications to vehicles with unit body construction unless a specific plan for testing, documentation of the testing, and acceptance has been developed for that specific modification and the modification based upon that plan has been accepted for purchase.

6.1.1 The manufacturer/modifier must provide documentation of compliance with the requirements noted below to the Rehabilitation Engineer at the address noted in 1.2.1.1 above.

6.1.2 The Rehabilitation Engineer will review the material and, if it meets these specifications, arrange a review of the equipment with Fleet Administration. The Rehabilitation Engineer will, with written concurrence from the Asst. Chief of Fleet Administration, notify the manufacturer in writing of the results of the review. (See 1.2.1 above) The designated inspector can refer to the Discussions and Interpretations addendum to this document, for modifiers whose

documentation concerning the modification of mini vans has been received and the modification accepted for purchase.

6.1.3 The same path to compliance noted in 6.1.1 above (or reasons why the original path to compliance was not disrupted) must be demonstrated for power floor pans or raised floors on a vehicle which has already demonstrated a path to compliance.

6.2 Mini Vans This acceptance for purchase procedure is specifically for mini vans which have had significant structural modifications made to the vehicle to facilitate use by an individual with a disability. The modifiers of these mini vans will, be considered second stage manufacturers.

6.2.1 This acceptance for purchase procedure is for mini-vans which are completed vehicles, sold with driver and passenger seats in front, and no driving modifications for a user with a disability other than the modifications for access to the vehicle interior. These access modifications include lowering the floor to make the vehicle appropriate for a driver/passenger seated in a wheelchair, a ramp to facilitate access to the vehicle and a modified rear suspension (to make the van lower when the ramp is extended and thus easier to enter). Powered doors and removable seats at both front positions are normally included. Other modifications such as moving the fuel system, the spare tire and the rear passenger seat are all part of the access modifications. All other modifications to the vehicle such as hand controls, accommodation for wheelchair driving, etc., are considered after market modifications and must be accepted for purchase based upon the remainder of the Specifications for Adaptive Equipment when completed by a local vehicle modifier.

6.2.1.1 Meeting the conditions of this acceptance procedure means only that the vehicle modification has been accepted for purchase on a vehicle supplied by the consumer or the Department of Rehabilitation.

6.2.1.2 Acceptance for purchase means that if a consumer owns or purchases a vehicle with unit body construction and with structural modifications which have been accepted for purchase, the Department of Rehabilitation can purchase additional modifications (hand controls, for example) for the vehicle.

6.2.1.3 Acceptance of a modification for purchase does not exempt each vehicle from inspection at the time of delivery. At

the time of this inspection, the modifications to the vehicle can still be rejected due to poor workmanship or the vehicle's failure to meet one of the criteria for acceptance. This decision will be based upon the judgment of the designated vehicle inspector, and these specifications.

6.2.2 The modifications must be made by a vehicle modifier (who will be called "modifier" in this portion of the Specifications) who is registered with the National Highway Traffic Safety Administration as a Second Stage Manufacturer.

6.2.3 The modifier must offer a warranty on all new and modified parts which is equivalent to the OEM warranty on those type components.

6.2.4 The modifier must comply with all of the State of California Specifications for Adaptive Driving Equipment except where the specifications for mini vans exceed the other specifications.

6.2.5 The welders employed by the modifier must be qualified to weld the type of materials and structure used in the OEM vehicle, and in the modification, where the structural modification is being welded. Welding certificates, other proof of welding competence, or specifications and quality control procedures must be furnished with the approval documentation.

6.2.6 The modified vehicle must have a payload sufficient to carry a 150 pound individual in every seat belted position (including a passenger in a wheelchair in the center of the van if wheelchair securement devices are available for that area).

6.2.7 The ground clearance with the vehicle in the upper (driving) position must meet California Department of Motor Vehicle regulations (Section 24008) "No portion of the vehicle, other than the wheels, must have less clearance from the surface of a level roadway than the clearance between the roadway and the lowermost portion of any rim of any wheel in contact with the roadway." In addition, with the vehicle in its lowest position, when parked on level ground, no portion of the vehicle, other than the wheels, may touch the ground with any one of the tires flat.

6.2.8 The modifier must supply, with the vehicle, a detailed manual of instructions for the modification concerning user operation, cautions concerning use by drivers other than the intended driver, recommended maintenance (if any), and the name, address, and

telephone number of the manufacturer or the manufacturer's designated representative. The user's manual must include instructions on the interpretation of all warning lights or other warning indicators as well as the manual operation of systems. A copy of the manual must be furnished with the approval documentation.

6.2.9 All changes resulting from the modification which would affect instructions affixed to the OEM vehicle must be accompanied by notices next to all affected portions of the affixed instructions indicating how the operation of the modified vehicle differs from the OEM vehicle. If changes to the vehicle affect information or instructions in the OEM Owners Manual, warnings must be included in the modifiers user's manual and, if possible, affixed near the affected parts of the vehicle indicating what portions of the OEM Owners Manual are no longer valid and what the new information should be. For example, if the jacking procedure is changed because of changes to the frame or skirting around the body, the instructions for jacking must be shown in the user manual indicating which part of the OEM Owners Manual is no longer valid. In addition a new decal (or other form of information sheet) must be mounted near the jacking instruction decal indicating the changed procedure. Copies of all notices affixed to the vehicle must be furnished with the approval documentation.

6.2.10 If a ramp is used to access the vehicle, the ramp must be capable of withstanding the following tests. The tests must be performed by a qualified testing laboratory and the results furnished with the approval documentation.

6.2.10.1 The ramp and folding mechanism must be able to withstand a life cycle test of 4,400 cycles

6.2.10.2 The ramp must be designed to support a routine operating load of 600 pounds at its mid point. It must also be capable of supporting a 900 pound proof load at its midpoint for one minute without any permanent bending, cracking, or changes which would detract from its continued performance.

6.2.10.3 After the proof load the ramp must be cycled an additional ten times to demonstrate that it has not been damaged to the point where it would not function properly.

6.2.11 If the vehicle modification includes a system to raise and/or lower the rear end of the vehicle for reduction of ramp angles for

loading, the raising and lowering mechanism must be capable of withstanding the following tests. The tests must be performed by a qualified testing laboratory and the results furnished with the approval documentation.

6.2.11.1 The lifting or lowering mechanism must be able to life cycle test of the empty vehicle for 4,400 cycles.

6.2.11.2 When the above test has been completed, the lifting mechanism must be able to withstand a life cycle test of the vehicle at its maximum GVWR for 20 cycles.

6.2.12 The manufacturer must have in place a program of quality assurance designed to reduce manufacturing defects, gather information about problems in the field, and resolve the problems both in the field and in production, including retrofitting and possible recalls. This program must include a policy of periodic inspection of selected vehicles after extended use. The latter inspection must be oriented towards the discovery and solution of latent problems (structural cracks, etc.) which may not cause immediate failure but may be a precursor to eventual safety problems. The plan and evidence of its effectiveness must be furnished with the acceptance documentation.

6.2.13 All mini vans modified by dropping the floor and installing a new floor pan/frame by a second stage manufacturer must comply with applicable Federal regulations including Federal Motor Vehicle Safety Standards (FMVSS) for any portion of the vehicle which has been modified and which is covered by a FMVSS. Proof of meeting these standards consists of submission of complete test data with the approval documentation to the Rehabilitation Engineer at the address noted in 1.2.1.1 above. This data must demonstrate the ability of the current vehicle or specific parts mentioned in the standards to meet each standard listed. Destructive vehicle tests must contain photographic evidence of the test having been completed. The vehicle in the photographic evidence must have the modification manufacturer's name or logo in a prominent location on the vehicle. Many mini van modifiers make changes which affect the following FMVSS standards. If, in the modification process, the system and components affected by any of the following FMVSS standards are not modified or affected, the modifier may present documentation stating that fact.

FMVSS 101 - Controls and Displays  
FMVSS 105 - Hydraulic and electric brake systems  
FMVSS 106 - Brake Hoses  
FMVSS 110 - Tire Selection and Rims for Motor Vehicles  
FMVSS 135 - Braking System  
FMVSS 204 - Steering Control Rearward Displacement  
FMVSS 206 - Door Locks and Door Retention Components  
FMVSS 207 - Seating System  
FMVSS 208 - Occupant Crash Protection  
FMVSS 209 - Seat Belt Assemblies  
FMVSS 210 - Seat Belt Assembly Anchorages  
FMVSS 301 - Fuel System Integrity  
FMVSS 302 - Flammability of Interior Materials

## **7. Transfer Seats and Passenger Seats**

### **7.1 Transfer seats**

7.1.1 Transfer seats bases must comply with Federal Motor Vehicle Safety Standard FMVSS 207. The vehicle modifier must have available information documenting the compliance with FMVSS 207.

7.1.2 The transfer seat, as installed:

7.1.2.1 Must be stable at the driving position recommended by the driving evaluation program.

7.1.2.2 Must be as closely centered on the steering wheel and be facing as directly forward as possible, considering consumer size etc.

7.1.2.3 Must have the front of the seat adjusted if needed to approximate the tilt back associated with the OEM seat base compared to the flat (level) mounting orientation of many transfer seat bases.

7.1.2.4 Must comply with the manufacturer's installation instructions in the vehicles specified in the instructions, or have written approval from the manufacturer for any deviations from the manufacturers recommendations to assure compliance with FMVSS 207. The vehicle modifier must have copy of that approval available for review by the designated inspector. Transfer seat securement which complies with the NMEDA QAP Guidelines is acceptable.

7.1.2.5 If the seat is installed on the transfer seat base with the safety belt receptacle installed at the side of the seat near the hip, the transfer seat base must have been tested for compliance with FMVSS 210 (Seat Belt Assembly Anchorages) for the forces encountered in the position the seat is expected to be used for driving. The vehicle modifier must have copy of that proof of compliance available for review by the designated inspector.

### **7.1.3 Swivel seats**

7.1.3.1 Manually operated swivel seats must lock firmly in place at forty-five (45) degree intervals (minimum).

7.1.3.2 The seat must swivel freely from the driving direction to the direction (angle) needed for transferring when the seat is at the transfer position.

7.1.3.2.1 The seat back must not interfere with the van wall. This may necessitate installing the transfer seat track at an angle so the seat back is clear of the van wall at the rearward position, but the seat is centered on the steering wheel. If this is done, the powered swivel seat stopping position must leave the seat facing straight forward at the final driving position.

7.1.3.2.2 The consumer must not need to use the manual forward and back adjustment on the seat base to accommodate the transition from the transfer position to the driving position.

7.1.4 Transfer seats must be appropriately fused.

7.1.5 Transfer seat installation must not affect the OEM designed operation of the air bags in the vehicle due to movement of significant portions of the air bag sensor system.

## 7.2 Transfer Bars, Loops

7.2.1 Transfer bars must not be attached to fiberglass raised tops or to a non-reinforced sheet metal area.

7.2.2 The transfer device must be attached to a structural member.

7.2.3 Attachment hardware must be through bolted with back plating if it comes under tension during transfer

7.3 Rear bench seats and other passenger seats must comply with Federal Motor Vehicle Safety Standard FMVSS 207 (Seating Systems), 209 (Seat Belt Assemblies) and 210 (Seat Belt Assembly Anchorages). The vehicle modifier must have available information documenting the compliance with FMVSS 207, 209 and 210.



## **8. Wheelchair Securement Devices and Safety Belts**

8.1 Wheelchair securement devices (for occupied or unoccupied wheelchairs) must be designed to be stable in all manners of normal driving to secure the wheelchair during an accident beyond the point where the wheelchair itself would structurally deform.

8.1.1 Wheelchair securement devices must be installed per the manufacturer's instructions in the vehicles specified in the instructions, or have written approval from the manufacturer for any deviations from the manufacturers recommendations. A copy of the installation instructions must be available for the designated inspector.

8.1.2 Wheelchair securement devices must not depend on tire pressure for proper operation (i.e., friction devices which clamp onto both sides of an appropriate wheelchair structure are acceptable but those which push or pull down on the wheelchair are not acceptable since a blown wheelchair tire would render them ineffective).

8.1.3 Wheelchair securement devices intended for use while the wheelchair is occupied must meet the following specifications.

8.1.3.1 The wheelchair securement devices must prevent the wheelchair from moving forward, backward, or laterally a maximum of ¼" and from tipping backward, forward, or side-to-side a maximum of 5 degrees under a 50-lb. load applied to the top of the back frame and the lower frame of the unoccupied wheelchair with the wheelchair brakes off.

8.1.3.2 The wheelchair securement device must not be attached to any part of the wheelchair designed for easy removal (e.g., footrests or armrests).

8.1.3.3 The wheelchair securement devices must not be attached to the wheels of the wheelchair.

8.1.3.4 The occupant must sit facing forward.

8.1.3.5 Consumers who ride as passengers must be secured by a four point wheelchair securement, or an accepted automatic securement designed for use by drivers who drive from their wheelchair, unless they are able to transfer into an OEM seat with OEM safety belts. If their wheelchair is to be carried in the vehicle, however, it must be secured by a device which meets the requirements of an unoccupied wheelchair securement used for a transfer seat. (see 8.2 below)

8.1.4 Wheelchair securement devices must not affect the OEM designed operation of the air bags in the vehicle due to movement of significant portions of the air bag sensor system.

8.1.5 Securement devices must not be installed for (and passengers must not ride in) three wheeled scooters or wheelchairs with a single post attachment between the seat and the frame of the mobility device without written approval of the Rehabilitation Engineer and, if the vehicle is state owned, with concurrence of the Assistant Chief, Office of Fleet Administration (See 1.1.2.2.1 above). The approval will be based upon evidence that there is an appropriate wheelchair securement available for the mobility device and that suitable provisions have been made for the seat to remain attached to the base/frame in the event of a motor vehicle accident. The vehicle modifier must have copy of that approval available for review by the designated inspector.

8.2 Vehicles equipped with transfer seats must have a wheelchair securement device to secure the unoccupied wheelchair.

8.2.1 The securement device must be of sufficient strength to restrain an unoccupied wheelchair.

8.2.2 The securement device must be clearly labeled "FOR UNOCCUPIED WHEELCHAIR ONLY" unless the securement is designed for an occupied wheelchair and meets all other relevant specifications in this document.

8.2.2.1 If the securement is designed for an occupied wheelchair, the only securement position possible must be with the occupant facing forward.

8.2.2.2 If the securement is designed for an occupied wheelchair, a safety belt must be provided (See 8.4 below).

8.2.3 The securement device must not only restrain the wheelchair to prevent injury from its movement during hard braking or an accident, it must restrain its movement sufficiently to assure access to transfer back into the wheelchair after hard braking or an accident.

8.3 Wheelchair Securement Device for a Driver Occupied Wheelchair

8.3.1 A driver's wheelchair securement device must be installed such that the consumer using the system can independently maneuver his/her wheelchair into and out of the driving position, operate the wheelchair securement device, and be able to determine that it is operating properly.

8.3.2 A driver's wheelchair securement device must have a means to keep the wheelchair ends from swiveling or rising during acceleration, deceleration or cornering incorporated into the wheelchair securement system.

8.3.3 A driver's wheelchair securement device must include an audible warning system which is activated when the ignition is on and the securement device has not secured the wheelchair.

8.3.3.1 The audible warning signal must be audible to a person with normal hearing in an 80 dB white noise environment.

8.3.3.2 A switch may be included in the system to deactivate the audible warning system (for example, when a mechanic is working on the vehicle). If such a switch is installed:

8.3.3.2.1 A blinking red light must be activated at all times when the audible warning system has been deactivated and the ignition is on.

8.3.3.2.2 The blinking red light must be at least ¼ inch diameter, be located on or near the instrument panel of the modified vehicle (within 15 degrees of the driver's normal line of vision), flash at 2 Hz, 50/50 on-off, and be labeled "CHECK WHEELCHAIR TIEDOWN".

8.3.3.2.3 The switch must be installed such that when the ignition is turned off, the audible warning is reactivated and the audible warning sounds when the ignition is turned back on.

8.3.4 A driver's wheelchair securement device must have a quick release mechanism which operates manually. The mechanism must be labeled "QUICK RELEASE" or equivalent. Instructions for the release of the securement device must be posted near the device.

8.3.5 The driver's wheelchair securement device must have been tested to perform as designed in a crash of 30 mph. The securement device must be installed per the manufacturer's installation instructions. The vehicle modifier must have available information documenting of the testing for the wheelchair being secured specified in the instructions, or have written approval from the manufacturer for any deviations from the manufacturers recommendations. A copy of the installation instructions must be available for the designated inspector. Wheelchair securement which complies with the NMEDA

QAP Guidelines is acceptable. A copy of the relevant NMEDA QAP Guidelines must be available for use by the designated inspector.

8.3.6 If the OEM van seat has been removed for a consumer to drive from his/her wheelchair, a removable/replaceable seat for other non-disabled drivers must be provided for the driver's station. The seat must be removable and/or installed without the use of tools. It should have at least 2 wheels to facilitate moving it into and out of the vehicle.

8.3.6.1 The removable seat must be designed to be installed such that it has OEM safety belts (or equivalent) at the driver's station. The safety belt must comply with item 8.4.1 below.

8.3.6.2 The removable seat may be stored out of the van when it is not in use by another driver, however, some means of securing the seat for safe transport in the van must be provided. In the event the seat is secured for transport in such a manner that it could be used as a passenger seat, the securement must be installed in compliance with Federal Motor Vehicle Safety Standards 207, 209 and 210. The vehicle modifier must have available information documenting the compliance with FMVSS 207, 209 and 210.

8.3.6.3 If the floor has been lowered at the driver's station, the removable seat must have an extension or adaptation to place the driver's seat at the OEM height for vision out of the windshield for the other driver.

8.3.6.3.1 The seat extension must be installed in compliance with FMVSS 207.

8.3.6.3.2 The vehicle modifier must have available information documenting the compliance with FMVSS 207.

8.4 A safety belt system must be provided at each passenger or driver location, including the driver-occupied wheelchair securement location, which meets the following specifications.

8.4.1 OEM safety belt systems should be retained whenever possible. If any part of an OEM safety belt system is removed or altered, the replacement safety belt system must be installed in compliance with Federal Motor Vehicle Safety Standards 209 and 210. The vehicle modifier must have available information documenting the compliance with FMVSS 209 and 210.

8.4.2 A driver safety belt system must include a lap belt and an upper torso restraint system and must be accessible to and independently operable by the intended driver with a disability.

8.4.2.1 If the intended driver cannot independently operate the OEM upper torso restraint system the following must be assured.

8.4.2.1.1 The driver must be able to move themselves, their seat or their wheelchair under an upper torso restraint system which will fit properly when the seat is in the driving position or the wheelchair is properly secured.

8.4.2.1.2 If a custom upper torso restraint system is used, that upper torso restraint system must be installed in compliance with FMVSS 209 and 210. (See 8.4.1 above).

8.4.2.1.3 The OEM upper torso restraint system should be retained, for use by able bodied drivers. If it must be removed for any reason, it must be replaced by a system which is in compliance with FMVSS 209 and 210. (See 8.4.1 above).

8.4.2.2 If the driver with a disability cannot independently operate the OEM lap belt system such that it would function properly, the following must be assured.

8.4.2.2.1 If the OEM seat/shoulder belt assembly is used for driver in a wheelchair but parts of the wheelchair (such as armrests or their supports) prevent the lap belt portion from fitting properly across the drivers lap, a lap belt must be added to provide a belt in the proper position.

8.4.2.2.1.1 If a custom lap belt is used, that lap belt must be installed in compliance with FMVSS 209 and 210. (See 8.4.1 above)

8.4.2.2.1.2 The seat belt must be installed such that the belt comes across the driver's hips, not the upper legs.

8.4.2.2.2 If the intended driver cannot put on a custom lap belt or the OEM safety belt independently, a lap belt may be attached to the driver's wheelchair (see 8.4.2.2.3)

which the driver may have fastened by someone else prior to entering the vehicle.

8.4.2.2.3 The lap belt for a driver occupied wheelchair must be attached to the van (or to the wheelchair securement system), not to the wheelchair itself unless the driver evaluation specifically recommends the attachment of the safety belt to the wheelchair.

8.4.2.2.3.1 If the seat belt is attached to the wheelchair, a bracket must be attached around the wheelchair frame to which the belt is attached with a suitable buckle. The seat belt must not be wrapped around the wheelchair frame with a bolt through the belt and the wheelchair frame.

8.4.2.2.3.2 The remainder of the seat belt assembly must be in compliance with FMVSS 209 (Seat Belt Assemblies). The vehicle modifier must have available information documenting the compliance with FMVSS 209.

8.4.2.2.4 The OEM lap belt should be retained, whenever possible, for use by able bodied drivers. If it must be removed for any reason, it must be replaced by a system which is in compliance with FMVSS 209 and 210. (See 8.4.1 above).

8.4.3 A passenger safety belt system for a passenger in a wheelchair must include a lap belt and, if the passenger is secured within 12" of a vehicle wall, an upper torso restraint system.

8.4.3.1 The seat belt system must be attached to the floor of the vehicle.

8.4.3.1 The safety belt system must comply with FMVSS 209 and 210. (See 8.4.1 above)

8.4.5 Safety belt securement to the vehicle floor which complies with the NMEDA QAP Guidelines is acceptable. If the NMEDA guidelines are used, a copy of the relevant NMEDA QAP Guidelines must be available for use by the designated inspector.

8.5 On any vehicle with an active air bag in the steering column, all efforts must be made to avoid removing the air bag.

8.5.1 Steering Terminal Devices (or other devices) which are installed using bars across the steering wheel must not be used.

8.5.2 Air bag sensing devices must not be moved from the OEM mounting position and/or location if the OEM has stated that it must not be moved.

8.5.3 If the air bag is disconnected because of the consumer's disability, a switch must be installed to allow others to make the air bag operative, if the air bag is still in place.

8.5.3.1 The switch must be key operated

8.5.3.2 The switch must be labeled to indicate its purpose and key position.

8.5.4 If the air bag is removed on the driver's side because of the consumer's disability (e.g. the steering wheel and/or steering column are removed), the passenger airbag must remain in full operation unless the consumer justifies and receives permission from National Highway Traffic Safety Administration for alteration of that system. (Permission to deactivate or remove the air bag on the driver's side is given in 49 CFR Part 595 "Exemption from the Make Inoperative Prohibition, Final Rule", February 27, 2001.)

8.6 Chest straps or other devices (such as shoulder supports) for trunk stability or other equipment must be added per the Driving Evaluator's recommendations. If the chest straps are added to an OEM seat, and the seat includes side air bags within the seat back, the side air bags must be disconnected unless Federal regulations are changed to make side air bags mandatory. If the side air bags become mandatory, contact the Driving Evaluation program for a substitute for the chest strap.

8.7 Headrests attached to wheelchair backs may be used by consumers, but headrests must not be attached to the vehicle for a consumer riding or driving in a wheelchair. If a manufacturer develops a headrest designed to break away before the back of a specific wheelchair folds over backward in a rear end collision (thus avoiding a neck flexion injury to the consumer), that manufacturer/modifier must provide documentation of the testing of the headrest/wheelchair system to the Rehabilitation Engineer. (See 1.2.1 above). The designated inspector can refer to an addendum to this document, the Discussions and Interpretations section, for modifiers whose documentation has been received and the modification accepted for purchase.

## 9. Primary Controls

### 9.1 Steering

9.1.1 All terminal devices, such as a tripin, must be padded for thermal protection so the consumer's hand will not rest on a metal surface.

9.1.2 Reduced Effort Steering - The term reduced effort steering is used as a general term which, at this time, includes several different methods to reduce the effort required to turn a steering wheel to a specified level below that needed for factory power steering. The vehicle modifier must state on the cost estimate the type and source of reduce effort steering modification, if it is subcontracted or if it is installed as a kit.

9.1.2.1 The torque required for steering control must be measured at the top of the steering shaft with the vehicle engine running at the factory recommended curb idle rpm with the engine warm and air conditioning off. This torque must be within the range of 10 - 25 in-lb. for steering designated as low effort steering and 4.0 -10 in-lb. for steering designated as "zero" effort steering.

9.1.2.2 The vehicle modifier must make the above measurement on a dry, smooth concrete surface with tire pressure and type of tire defined. The vehicle modifier must be able to reproduce the measurements on any van at the request of the Rehabilitation Engineer or the Assistant Chief of Fleet Administration (on State purchased vehicles).

9.1.2.3 Every reduced effort steering system must have a backup system. Automatic activation of the power steering backup system is mandatory in case of primary power system failure as a result of at least the following causes: primary engine failure, broken power steering belt or a power steering pump failure. These same specifications must be met for power steering backup systems which are installed independently, without being associated with reduced effort steering.

9.1.2.4 Steering devices (levers, etc.) other than a steering wheel or terminal device attached to the steering wheel must be accepted for purchase by the Rehabilitation Engineer, with the written concurrence of the Assistant Chief of Fleet



Administration. (See 1.2.1 above). A copy of that acceptance must be available for review by the designated inspector.

9.1.2.5 Manual Activation - There must be a provision for driver (manual) actuation of the Power Steering Backup system which bypasses the automatic control circuit.

9.1.2.5.1 The manual activation (“ON”) switch must be immediately accessible to the driver leaving one hand available for steering.

9.1.2.5.2 A warning light must be provided to indicate if the system is being manually operated. The light must be (amber) and labeled “STEERING BACKUP ACTIVATED”.

9.1.2.6 When zero effort power steering is installed on a vehicle and a steering device is attached to the steering wheel, a counterweight equivalent to the weight of the steering device and any attaching fixture must be added to balance the steering wheel. This counterweight must be mounted on the steering wheel directly opposite (180 degrees away from) the steering device and be removable in the same manner as the steering device to facilitate removing both when an able bodied person drives the vehicle.

9.1.3 Steering wheel sizes smaller than 9” diameter or larger than 16” diameter must not be installed unless accepted in writing by the Rehabilitation Engineer. The vehicle modifier must have copy of that approval available for review by the designated inspector. This specification applies only to wheels on the OEM steering system and excludes remote steering systems.

9.1.4 Modified steering systems must not require frame cutting.

9.1.5 Steering column extensions must not interfere with normal collapsibility of the steering column as governed by FMVSS 203 (Impact Protection for the Driver from the Steering Control System) and FMVSS 204 (Steering Control Rearward Displacement). The vehicle modifier must have available information documenting the compliance with FMVSS 204.

9.1.6 Modified power steering boxes must be identified as such (by painted signs, tags, etc.) to prevent inadvertent repair or replacement with non-modified units

9.1.7 Remote steering systems are steering systems where the steering wheel (or other steering device) is connected to a powered control system which operates the steering.

9.1.7.1 Because the steering wheel (or other control device) of a remote steering system is not mechanically connected directly to the OEM power steering box through a steering shaft, remote steering systems must be subject to a system review prior to acceptance for purchase. This review is a one-time only review (unless the remote steering system is changed).

9.1.7.1.1 The manufacturer of the remote steering system must provide all components needed for the installation of the control system except terminal devices and the brackets needed to mount the box to which the terminal device is attached.

9.1.7.1.1.1 While the manufacturer must make available terminal devices needed by consumer to operate the remote steering system, the vehicle modifier may choose to fabricate those terminal devices locally to meet the needs of the consumer. If the manufacturer has specific constraints or design considerations related to the local fabrication of terminal devices, they should be noted in the installation instructions.

9.1.7.1.1.2 While the manufacturer must make available the brackets needed to mount the “box” on which the terminal device is mounted, the vehicle modifier may choose to make those brackets locally to meet the needs of the consumer. If the manufacturer has specific constraints or design considerations related to the local fabrication of these mounting brackets, it should be noted in the installation instructions.

9.1.7.1.1.3 The remote steering system must have backup capability for critical functions.

9.1.7.1.2 The manufacturer must provide documentation including installation instructions specific to the make model and year of the vehicle for which the control

system is intended for use (including fitting and adjustment details), user manuals (including system operation, warranty information and maintenance requirements), systems descriptions, results of any testing, and proof of liability insurance to the Rehabilitation Engineer. The written material will be considered confidential, but kept on file. The Rehabilitation Engineer will review the material and, if it meets these specifications, arrange a review of the uninstalled system and then a review of the of the installed equipment with Fleet Administration.

9.1.7.1.3 An uninstalled system with all components normally shipped with a remote steering system must be made available for detailed inspection and manipulation by Rehabilitation Engineering for at least one full day. This must be made available at no cost (return shipping etc.) to the Department of Rehabilitation.

9.1.7.1.4 A demonstration vehicle with an operational remote steering system must be made available for review. The review must be carried out by staff of both Fleet Administration and Rehabilitation Engineering. An individual knowledgeable with all aspects of the system must be available for the review. The vehicle is needed only for one day to test drive and evaluate the installation methods.

9.1.7.1.5 The Rehabilitation Engineer will, with the written concurrence of the Assistant Chief of Fleet Administration notify the manufacture of the acceptance (or rejection, including reasons for rejection, of the modification). (See 1.2.1 above) The designated inspector can refer to an addendum to this document, the Discussions and Interpretations section, for modifiers whose documentation has been received and the modification accepted for purchase.

#### 9.1.7.2 Remote Steering Installation

9.1.7.2.1 Any vehicle modifier installing a remote steering system must meet all qualifications recommended by the manufacturer. For example, if a manufacturer requires

that the installer attend a special school or class, the vehicle modifier technician installing the system must have attended that class. The remote steering system must be installed exactly per the manufacturer's installation specifications and recommendations, in the vehicles specified in the specifications, or have written approval from the manufacturer for any deviations from the manufacturers recommendations. A copy of that written approval must be sent to the Rehabilitation Engineer. The vehicle modifier must have copy of that approval available for review by the designated inspector.

9.1.7.2.2 After the remote steering system is installed, it must be fixed permanently in place before final delivery to the consumer.

9.1.7.2.2.1 It may be temporarily positioned for adjustments during the fitting and follow-up at the vehicle modifier by the evaluator, but it must be fixed in position before delivery to the consumer.

9.1.7.2.2.2 The permanent fixing may involve welding, pinning, special screws, etc. to preclude adjustment of the position of the powered hand control by anyone but the vehicle modifier or adjustment with common hand tools.

9.1.7.2.2.3 A good time for permanently fixing the control is when the vehicle is returned to have the instructor brake removed.

9.1.7.2.3 Remote steering systems may emit or be affected by electromagnetic interference. They must not be used in conjunction with components of another manufacturer's remote steering, powered control or secondary control console without both manufacturers knowledge and permission. A copy of that written approval must be sent to the Rehabilitation Engineer. The vehicle modifier must have copy of that approval available for review by the designated inspector.

9.1.8 Steering modifications which affect the steering column must comply with FMVSS 203 - Impact protection for the driver from the steering control system and FMVSS 204 - Steering control rearward

displacement. The vehicle modifier must have available information documenting the compliance with FMVSS 203 or 204 if applicable.

9.1.9 In conjunction with any steering modification a label must be prominently and permanently fixed in a prominent location on or near the instrument panel of the modified vehicle stating “WARNING - THIS VEHICLE IS EQUIPPED FOR A DRIVER WITH A DISABILITY. DO NOT OPERATE WITHOUT PROPER INSTRUCTION.”

## 9.2 Brakes

9.2.1 Reduced-effort brakes must reduce the force needed to move the control used by the consumer through three-fourths of its total travel to 5 lb. or less to qualify as reduced-effort brakes.

9.2.1.1 The vehicle modifier must state on the cost estimate the type and source of reduce effort brake modification if it is subcontracted or installed as a kit.

9.2.1.2 All reduced effort braking modifications must incorporate into the modification a backup capability in case of engine failure or primary power brake booster failure. The backup system must be activated automatically with no driver input needed. These same specifications must be met for power brake backup systems which are installed independently, without being associated with reduced effort braking.

9.2.1.2.1 The backup source of braking energy must be isolated from the primary source through a check valve or other appropriate means of assuring that a primary system failure will not cause a failure of the backup system.

9.2.1.2.2 The backup system must include a gauge and a low vacuum buzzer set to 8” of vacuum (for vacuum systems). This buzzer must emit a sound different from the wheelchair securement buzzer if the consumer drives from a wheelchair.

9.2.1.3 The pedal reserve in the vehicle in which reduced effort braking or reduced effort braking backup system has been installed must be no less than in the vehicle with standard (OEM) power brakes.

9.2.1.4 Modified power brake components must be identified as such (by painted signs, tags, etc.) to prevent inadvertent repair or replacement with non-modified units.

9.2.2 Brake pedal modifications and foot supports must be securely attached to the vehicle.

9.2.3 Quick release brake pedals are not allowed.

9.2.4. There must be no changes to the braking system which remove the OEM vehicle from compliance with FMVSS 105 (Hydraulic Brake Systems) for vehicles manufactured after September 1, 2002 and which weigh over 7116 pounds or FMVSS 135 (Passenger Car Brake Systems) for vehicles manufactured after September 1, 2002 and which weigh under 7116 pounds. If changes are made which affect compliance, the vehicle modifier must have available information documenting the compliance with FMVSS 105 or 135.

9.2.5 In conjunction with any brake modification, a label must be placed on the instrument panel of the modified vehicle stating "WARNING - THIS VEHICLE EQUIPPED FOR A DRIVER WITH A DISABILITY. DO NOT OPERATE WITHOUT PROPER INSTRUCTIONS."

### 9.3 Parking Brake

9.3.1 There must be a parking brake which the consumer can operate, of the type recommended by the Driving Evaluation Program.

9.3.2 A powered parking brake must be held in the applied position by mechanical means (i.e., not hydraulic, pneumatic, or vacuum etc.) where loss of pressure over time would grossly affect performance.

9.3.3 There must be a light, visible from the driver's station, which is lit when the powered parking brake is on and the ignition is on.

### 9.4 Hand Controls

9.4.1 Mechanical Hand Controls - There are specifications written by the Veterans Administration which have been available and have been the basis of hand control acceptance for years. There are now standards available from the Society of Automotive Engineers (SAE). All hand controls must be accepted for purchase on the basis of one of the following criteria. The designated inspector can refer to an addendum to this document, the Discussions and Interpretations section, for modifiers whose documentation has been received and the modification accepted for purchase.

9.4.1.1 Any hand control which has been certified as meeting Society of Automotive Engineers (SAE) J1903, July, 1997, "Automotive Adaptive Controls" Manual is acceptable for purchase. Manufacturers must provide documentation of the certification to the Rehabilitation Engineer in the form of an installation protocol and test data. (See 1.2.1 above)

9.4.1.2 Any hand control which has been tested by the Veterans Administration, or any other agency acceptable to Rehabilitation Engineering and Fleet Administration, and found to meet the specifications drafted by the U.S. Veterans Administration (VAPC-A-7505-8. Program Guide, Prosthetic and Sensory Aids Service M-Z, Part IXZ, G9 Veterans Administration, Washington, DC 20420, March 31, 1978) Manual will be acceptable for purchase. Manufacturers must provide documentation of Veterans Administration acceptance to the Rehabilitation Engineer. (See 1.2.1 above)

9.4.1.3 New hand controls which have not been certified as meeting SAE J1903 or have not been tested or accepted by the Veterans Administration can be provisionally accepted for purchase by Rehabilitation Engineering in consultation with the Assistant Chief of Fleet Administration. (See 1.2.1 above) This is an interim acceptance for purchase. This interim acceptance will be good for one year from the date of acceptance, beyond which time the hand control will not be accepted unless tested and accepted.

9.4.2 All custom fabricated hand controls must be accepted by the Rehabilitation Engineer. This approval is to be based upon coordination with the Fleet Administration Division to determine if the problem can be solved in any other way. The manufacturer/modifier must provide drawings of, or a sample of, the control to the Rehabilitation Engineer. The Rehabilitation Engineer will review the material and, if it meets these specifications, arrange a review of the equipment with Fleet Administration. (See 1.2.1 above)

9.4.3 Hand controls, as installed, must be capable of operation to full throttle (with the disabled driver in the driving position), and applying full brakes to the hand control (20 pounds force on power brakes, 5 pounds force for reduced effort) with the engine running and no interference with any parts of the vehicle, or driving system, in

any motion or combination of motions. While testing these motions, there must not be any contact of the hand control with other parts of the vehicle (window crank handles, power window motors mounted on the door panel, etc.) which move or must be moved in order to operate the vehicle (e.g., turn signals or shift levers), when these other parts of the vehicle are in positions which may be used while driving.

9.4.4 Modifications to engine accelerator components to reduce accelerator effort must not be installed. Any return forces needed to counter act the weight of the hand control, etc., must be made at or near the hand control. *Or comply with FMVSS 125.*

9.4.5 Hand controls must only be installed in cars with power brakes, power steering and automatic transmission.

9.4.6 Floor-mounted push pull hand controls must meet the following specifications.

9.4.6.1 A pin or other locking mechanism must be installed so the hand control can be locked in the neutral position to eliminate the effects of momentum on the hand controls when the vehicle is driven using the foot pedals.

9.4.6.2 The hand control must be installed such that it is not possible for any parts of the lever mechanism to go “over center” and lock on at either full throttle or full brake.

9.4.7 Portable Hand Controls - Portable Hand Controls must not be installed for use by consumers of the Department of Rehabilitation.

9.4.7.1 Only permanently installed hand controls must be purchased.

9.4.7.2 Parts of a hand control must not be attached to the vehicle or any other part of the hand control using Velcro® or straps, to allow quick removal of the hand control, or movement of the control to another vehicle.

9.4.7.3 The hand control must be mounted such that the terminal device (handle) is in a fixed location once the control has been adjusted for the consumer.

9.4.8 Powered Hand Controls

9.4.8.1 Powered hand controls must be subject to a system review prior to acceptance for purchase and comply with SAE J2603 and J2604. This review is a one-time only review (unless the system is changed). The vehicle modifier must



state on the cost estimate the type and source of reduce effort brake modification if it is subcontracted or installed as a kit.

9.4.8.1.1 Powered hand controls must comply with FMVSS 124 and SAE J2603. The manufacturer/modifier must provide documentation of compliance to the Rehabilitation Engineer. (See 1.2.1 above)

9.4.8.1.2 The manufacturer of the powered hand control must provide all components needed for the installation of the control system except terminal devices and the brackets needed to mount the box to which the terminal device is attached.

9.4.8.1.2.1 While the manufacturer must make available terminal devices needed by consumer to operate the control, the vehicle modifier may choose to fabricate those terminal devices locally to meet the needs of the consumer. If the manufacturer has specific constraints or design considerations related to the local fabrication of terminal devices, they should be noted in the installation instructions.

9.4.8.1.2.2 While the manufacturer must make available the brackets needed to mount the “box” on which the terminal device is mounted, the vehicle modifier may choose to make those brackets locally to meet the needs of the consumer. If the manufacturer has specific constraints or design considerations related to the local fabrication of these mounting brackets, it should be noted in the installation instructions.

9.4.8.1.2.3 The powered control system must have backup capability for critical functions.

9.4.8.1.3 The manufacturer must provide documentation including installation instructions specific to the make model and year of the vehicle for which the control system is intended for use (including fitting and adjustment details), user manuals (including system operation, warranty information and maintenance requirements), systems descriptions, results of any

testing, and proof of liability insurance to the Rehabilitation Engineer. The Rehabilitation Engineer will review the material and, if it meets these specifications, arrange a review of the uninstalled system then a review of the installed equipment with Fleet Administration.

9.4.8.1.4 An uninstalled system with all components normally shipped with a powered hand control system must be made available for detailed inspection and manipulation by Rehabilitation Engineering for at least one full day. This must be made available at no cost (return shipping etc.) to the Department of Rehabilitation.

9.3.8.1.5 A demonstration vehicle with an operational powered hand control system must be made available for review. The review must be carried out by staff of both Fleet Administration and Rehabilitation Engineering. An individual knowledgeable with all aspects of the system must be available for the review. The vehicle is needed only for one day to test drive and evaluate the installation methods.

9.4.8.1.6 The Rehabilitation Engineer will, with the written concurrence of the Assistant Chief of Fleet Administration, notify the manufacturer of the acceptance (or rejection, including reasons for rejection, of the powered hand control). (See 1.2.1 above) The designated inspector can refer to an addendum to this document, the Discussions and Interpretations section, for modifiers whose documentation has been received and the modification accepted for purchase.

#### 9.4.8.2 Powered Hand Control Installation

9.4.8.2.1 Any vehicle modifier installing a powered hand control must meet all qualifications recommended by the manufacturer and comply with SAE 2603. For example, if a manufacturer requires that the installer attend a special school or class, the vehicle modifier technician installing the system must have attended that class. The powered hand control must be installed exactly per the manufacturer's installation specifications and recommendations, in the vehicles specified in the

specifications, or have written approval from the manufacturer for any deviations from the manufacturers recommendations. A copy of that written approval must be sent to the Rehabilitation Engineer. The vehicle modifier must have copy of that approval available for review by the designated inspector.

9.4.8.2.2 After the hand control is installed, it must be fixed permanently in place before final delivery to the consumer.

9.4.8.2.2.1 It may be temporarily positioned for adjustments during the fitting and follow-up at the vehicle modifier by the evaluator, but it must be fixed in position before final delivery to the consumer.

9.4.8.2.2.2 The permanent fixing may involve welding, pinning, special screws, etc. to preclude adjustment of the position of the powered hand control by anyone but the vehicle modifier.

9.4.8.2.2.3 A good time for permanently fixing the control in position is when the vehicle is returned to have the instructor brake removed.

9.4.8.2.3 Powered controls may emit or be affected by electromagnetic interference. They must not be used in conjunction with components of another manufacturer's powered control. Remote steering or secondary control console without both manufacturers knowledge and permission. The Rehabilitation Engineer must be informed of any such combination of controls for which the manufactures permissions have been obtained. The vehicle modifier must have copy of that approval available for review by the designated inspector.

9.4.8.3 The powered hand control must be installed with the rearward motion used for operating the brakes and the forward motion used for operating the accelerator, unless otherwise mandated by the manufacturer, or specified by the evaluator.

9.4.9 A label must be placed on the instrument panel of any vehicle in which a hand control or a left foot accelerator has been installed stating "WARNING - THIS VEHICLE IS EQUIPPED FOR A DRIVER

WITH A DISABILITY. DO NOT OPERATE WITHOUT PROPER INSTRUCTIONS”.

9.5 Other considerations for primary control installation.

9.5.1 All connection components (wires, hoses, tubes etc.) and combinations of connection components used to connect control components to the remainder of the control or to the vehicle must meet the following specifications.

9.5.1.1 Connection components leaving the control must be protected against damages in normal use such as door opening/closing, catching on wheelchair components, etc.

9.5.1.2 Components which are removable or detachable must have connection components of sufficient length to accommodate all normal motion of parts to which they are attached and not subject the connection components to stretching, chafing or bending which could harm them.

9.5.1.3 All holes in the vehicle, the control or other systems through which connection components pass, must protect those components from abrasion.

9.5.2 All connections of the control to other components of the control and to the vehicle must be positively attached and retained.

9.5.2.1 Where threaded, bonded, or press fit connections are not used, clamps or other suitable methods of maintaining connection integrity must be employed.

9.5.2.2 All electrical and electronic connectors must be installed to maintain surety of connection while subjected to vibration, shock, and the extreme temperatures that are normal environmental conditions for motor vehicles. Surety of connection must be accomplished through the use of integral-molded lock devices, terminal-to-terminal interference (detents), secondary locking clips, or attaching devices.

9.5.3 Components of the control that are attached to, or installed onto the vehicle, in order to install the control must not interfere with the function of the OEM vehicle.

9.5.4 Installation of the control must not require alterations to the vehicle, which diminish the structural integrity of the vehicle.

9.5.5 The location, weight, and positioning of the control must not degrade the quality, handling characteristics, outward visibility, reliability, and efficiency of operation of the vehicle.

9.5.5.1 The space between parts of the installed control and the vehicle must be adequate to allow access to vehicle components for normal use and service.

9.5.5.2 The control must not interfere with the OEM primary airbags (or other primary occupant protection) safety system.

9.5.6 The user of the control and other occupants of the vehicle must not be subject to injury during normal control or vehicle movement due to contact with rough edges or burrs, projections or moving parts on the control or any pinching or crushing between components of the OEM vehicle and the control. Particular attention must be given to the proximity between moving components and the hands, legs, feet and head of the vehicle occupants.

9.5.7 The installed control must not offer unreasonable risk to the user, or to any other vehicle occupant, at any time during its operating cycle from electrical shock, burns, abrasive surfaces and parts that may exhibit extremes of temperature.

9.5.8 The control must not present greasy surfaces inside the vehicle that can be contacted by the user or other vehicle occupants.

9.4.9 The location and surface finish of the control must not present any direct obstruction to, or reflection of bright light into, the field of view of the driver.

9.5.10 If the manufacturer of the installed control does not supply a designated ground wire but depends upon mounting hardware to connect the control to ground, the vehicle modifier must see that any insulating materials around the mounting hardware, such as paint, carpet etc., are removed to assure a proper electrical path to ground. Serrated washers are recommended to improve grounding contact. A separate grounding strap may be used if needed.

9.5.11 If the vehicle being modified with hand controls (or a left foot accelerator) is equipped with OEM power adjustable pedals, the vehicle modifier must disable the power adjustable pedals prior to installing the hand controls. A label must be installed at the point that the adjustable pedals were disabled warning why the system has been disabled.

9.6 Instructor Brakes must be securely fastened to the floor of the passenger side of the vehicle.

## 10. Secondary Controls

10.1 Secondary control must comply with SAE J2388 (September 2011) Secondary Control Modifications. The vehicle modifier must have available information documenting the compliance with SAE J2388.

10.2 All control extensions must be securely attached.

10.3 Power window units mounted on the interior surface of doors must not interfere with the wheelchair or other vehicle components, especially hand controls.

### 10.4 Turn Signal Extensions

10.4.1 The turn signal lever must not work loose if extended. (i.e., off center attachments to screw in levers are not allowed.)

10.4.2 Clamp on turn signal extensions must not be used on multipurpose turn signal levers which can be crushed or damaged.

### 10.5 Secondary control consoles

10.5.1 Secondary control consoles must be lit when the vehicles headlights are on. The lighting must be such that it allows quick reading of the switch labels at night but does not interfere with the driver's night vision.

10.5.2 Overhead consoles (except designated portions of head operated switches) must not obstruct the driver's head in any motion when the driver is properly secured at the driver's station.

10.5.3 Engine cover mounted secondary control consoles which must be detached from the engine cover for maintenance of the console or to remove the engine cover must be safely detachable, leaving no exposed "hot" wires, etc. There must be no danger of electrical shock or inadvertent operation of the console controls while working on the engine.

10.5.4 Secondary control consoles must be entirely enclosed such that no wiring, backs of switches, etc., are exposed. Only the connection components (wires, tubes etc.) leaving the control console may be exposed.

10.5.5 Secondary control consoles must comply with FMVSS 101 (Controls and displays). The vehicle modifier must have available information documenting the compliance with FMVSS 101.

10.5.6 Secondary control consoles may emit or be affected by electromagnetic interference. They must not be used in conjunction with components of another manufacturer's secondary control console, remote steering or powered control without both

manufacturer knowledge and permission. The Rehabilitation Engineer must be informed of any such combination of controls for which the manufacturer's permissions have been obtained. The vehicle modifier must have copy of that approval available for review by the designated inspector.

10.5.7 Secondary control consoles mounted on headrests must comply with section 8.7 above

10.6 On vehicles where hand controls are used, operation of switches for headlights, windshield wipers, horn, and headlight dimmers must not require removal of driver's hand from the steering wheel.

10.7 On vehicles where hand controls are used, shift operation and operations of power parking brake must not require removal of driver's hand from the hand control brake unless provisions are available to secure the brake during the shift operation.

10.8 The consumer must be able to reach all modified driving controls requested in the Driving Evaluation which must be operated when the vehicle is in motion while in the driver's position with all safety belts and trunk supports/chest harnesses fastened and tightened.

10.9 Power shifters must have shift positions (P, R, N, and D), indicated specifically, functional, and lit for night use. It is recommended that they also have at least one low gear available. They must have interlocks to not allow shifting if the service brake is not applied. Any OEM interlocks must not be defeated.

10.10 Extensions on slide switches must not be over 2 inches with simple clamp on extensions. (Longer extensions cause binding in the switch mechanism and broken levers.)

10.11 All switches, controls and warning lights added for the consumer's use while driving must be clearly labeled as to function and direction of use with the labels lit when the vehicle's headlights are on.

10.12 Consoles containing ignition/starter switches

10.12.1 The ignition switch must be protected by a time delay, an interlock, or some other means to prevent inadvertent operation while driving.

10.12.2 The system must be coded or otherwise designed to prevent theft of the vehicle. This specification may be waived in writing by Rehabilitation Engineering, with written concurrence from the Asst. Chief of Fleet Administration, if it can be shown that the system cannot easily be converted to a method of driving which does not

require extensive training. The designated inspector can refer to an addendum to this document, the Discussions and Interpretations section, for modifiers whose documentation has been received and the modification accepted for purchase.

10.13 All of the following secondary controls must be operable by the intended driver with a disability

10.13.1 Horn, headlight dimmer, turn signals and at least one mode of windshield wiper operation must be operable by the driver with a disability for whom the vehicle is intended while driving and minimum or no removal of the hands from a hand control (if installed) and no removal of hands from the steering wheel or steering control device.

10.13.2 Headlights, shifting, power door locks, power windows, hazard lights, heater and air conditioner controls and all modes of windshield wiper operation must be operable by the driver with a disability for whom the vehicle is intended with the vehicle parked unless recommended otherwise by the driving evaluator.



## 11. Electrical

11.1 All non OEM switches in the driver's compartment must meet the specifications of FMVSS 101. The vehicle modifier must have available information documenting the compliance with FMVSS 101.

11.2 All wiring must be automotive stranded type and color coded, with no wires of the same color in the same loom or harness.

11.3 All wiring to the same equipment must be grouped together and protected by an aircraft type loom to withstand abrasion unless electromagnetic induction considerations specifically require separation.

11.4 Wire size must be sufficient to minimize voltage drop (maximum 5%) and to prevent overheating.

11.5 Wiring must have sufficient slack to accommodate all normal motion of parts to which it is attached.

11.6 Wiring must be supported and located to prevent enmeshing in moving parts. All wiring under the vehicle must be in a loom and attached to the vehicle every 18" with insulated clamps.

11.7 All wires passing near mufflers, exhaust pipes, catalytic converters, etc., must be appropriately shielded and preferably re-routed. None must be within 2" of such objects.

11.8 Wire, lines, etc., must not be bent over the edge of any structure or be exposed to sharp metal edges.

11.9 All holes through which wires pass must have grommets or the wiring otherwise protected from chaffing.

11.10 Each circuit for a device drawing significant current (transfer seats, wheelchair securement devices, etc.) must have a self-resetting circuit breaker close to the power supply.

11.10.1 If the circuit (excluding circuits for lifts) is subject to temporary, inadvertent overloads, (e.g., wheelchair loaders where the wheelchair could get stuck) an override emergency switch protected by a second, self-resetting circuit breaker must be installed.

11.10.2 All circuit breakers must be labeled as to their function or a chart specifying their function and location must be provided to the consumer.

11.11 Adequate provisions must be made for proper grounding of electrical equipment and fuel system per OEM or aftermarket manufacturer specifications.

11.12 Every vehicle modification must have a complete wiring diagram showing major components and subassemblies by name, location, and

wire color or an exception approved by the Rehabilitation Engineer. A copy must be kept on file by the vehicle modifier for a minimum of 5 years.

11.13 All wiring which does not go through the ignition switch, (lift, etc.) and is added as a part of that modification must be routed to an auxiliary main terminal (bus bar) with only one wire from the battery to the auxiliary main terminal.

11.13.1 The primary cable must be at least large enough to carry all additional loads per current SAE specifications.

11.13.2 Each terminal on the terminal strip must have no more than two (2) wires attached.

11.14 Any electrical systems added as part of the total modification, which must be activated by the ignition switch, must be controlled by a relay to protect the ignition switch.

11.15 All electrical connections and terminals which utilize crimp connections, must utilize crimp connectors of the type which crimp the insulator as well as the wire.

11.16 All main power connectors for #0 or larger wire must use swaged rather than crimped fittings.

11.17 Wires between the van body and doors, etc., must be properly harnessed, protected, and protected from chafing, work hardening, pinching, and other problems caused by the motion.

11.18 Wiring must be accessible for repairs without the destruction of any components except for wheelchair lift threshold warning pads. For example, wiring must not be behind glued, welded, or other permanently fastened components such as welded panels, carpet, etc.

11.19 Auxiliary batteries must not be provided without justification in the Driving Evaluation and prior written approval by the Rehabilitation Engineer, unless their use is mandated by a manufacturer as an integral part of the design. If applicable, the vehicle modifier must have copy of that approval available for review by the designated inspector.

11.19.1 When auxiliary batteries are provided and their storage location intrudes into the passenger compartment, they must be gel-type batteries or sealed equivalent, mounted in a separate compartment which is secured in such a manner that the battery will not move from that location.

11.19.2 Wherever an auxiliary battery is installed, it must be easily accessible for maintenance and replacement and protected from damage.

11.19.3 The auxiliary battery must be electrically isolated from the primary vehicle battery and must not be wired such that it can be used to start the vehicle. It must only be used for backup power to a modification added to the vehicle.

11.20 Modifiers must exercise caution and good engineering practices in the installation of electrical wires and components whose electromagnetic interference (EMI) may cause the location of one electrical component to adversely affect (or be affected by) other electrical components.

11.21 Due to the increasing complexity in vehicles' electrical systems, when installing any controls or devices which connect to the OEM vehicle electrical system, the vehicle modifier shall follow the manufacturer's installation manual explicitly and with no deviations. If the manufacturer's instructions are not specific to the year, make and model of vehicle, contact the control or device manufacturer for the latest information on the exact method of interfacing with the vehicle on which you are working. Tapping into OEM wires for modifications other than per control manufacturer's instructions can affect signals going to and from electronic modules, causing malfunctions or damaging OEM electronics. Vehicle modifiers must not to cut, modify, or attach anything to the OEM electrical system unless they have detailed, up to date information about any impact those changes could make. An OEM service manual or online service must be available to provide wiring diagrams and support for all connections to the OEM electrical system. The information must be specific to the Year, Make, and Model of the vehicle.

## 12. Other Items

12.1 Written instructions on use and maintenance of all major modifications (lifts, power doors, wheelchair securement devices, reduced effort brakes, or steering, etc.) must be furnished to the consumer. All owner's manuals furnished by the manufacturer of a product must be furnished to the consumer upon delivery of the vehicle.

12.2 The vehicle modifier must make provision to secure any consumer supplied equipment in the vehicle for which the vehicle modifier provides support (e.g., if vehicle modifier must supply a 12 Volt DC outlet for a respirator, a securement for the respirator must be included in the cost estimate and installed).

12.3 All modifications to OEM components must be identified as such (by painted signs, tags, etc.) to prevent inadvertent repair or replacement with non-modified parts.

12.4 All modifications and related vehicle equipment must be accessible for servicing.

12.5 A list of all modifications made to the vehicle must be furnished to the consumer. The list must include all modifications added to the vehicle (such as a wheelchair lift) as well as modifications to the Original Equipment Manufacturer's components equipment (i.e., "sensitized steering with backup") and must note that the standard power steering box has been modified internally).

12.6 If any of the modifications make inoperative any part of a device or element of design installed on or in the motor vehicle in compliance with a Federal motor vehicle safety standard or portion thereof described in 49 CFR Part 595.7(c) - Exemptions from the Make Inoperative Prohibition, the vehicle modifier must affix a label to the motor vehicle. The label must

12.6.1 Be permanently affixed to the vehicle

12.6.2 Be located adjacent to the original certification label or the alterer's certification label, if applicable

12.6.3 Give the vehicle modifier's name and physical address.

12.6.4 Contain the statement "This vehicle has been modified in accordance with 49 CFR Part 595 and may no longer comply with all Federal Motor Vehicle Safety Standards in effect at the time of its original manufacture.

12.7 If the conditions noted in 12.6 above exist, the vehicle modifier must create a document which must:

- 12.7.1 Be provided, in original or photocopied form, to the consumer of the vehicle at the time the vehicle is delivered to the consumer.
- 12.7.2 Be kept, in original or photocopied form at the address provided on the label noted in 12.6.3 above for a period of not less than five years after the vehicle, as modified, is delivered to the individual for whom the modifications were performed
- 12.7.3 Clearly identify the vehicle that is modified.( year, make, model, mileage, VIN)
- 12.7.4 Contain a list of the Federal motor vehicle safety standards or portions thereof specified in 49 CFR Part 595.7(c) with which the vehicle may no longer be in compliance.
- 12.7.5 Indicate any reduction in the load carrying capacity of the vehicle of more than 100 kg (220 lb.) after the modifications are completed. In providing this information, the modifier must state whether the weight of the user's wheelchair is included in the available load capacity.
- 12.8 The modified vehicle, as delivered and with all fluids must not exceed the vehicles GVWR with all seat belted positions filled with a 150 pound occupant and the consumer's wheelchair (if any) in the vehicle.
- 12.9 All existing components removed from the vehicle during modification are the property of the legal owner of the vehicle.
- 12.9.1 The components must be offered in writing to the owner of the vehicle upon delivery of the vehicle to the consumer (i.e., original steering wheel, seats, etc.).
- 12.9.2 If the Department of Rehabilitation is owner of the vehicle, the vehicle modifier must notify the counselor that the parts are available, what storage considerations are available (how long, cost, etc.), and charges for shipping to a location specified by the Department of Rehabilitation counselor.
- 12.9.3 If the owner declines to remove the components from the vehicle modifier's property or does not contact the dealer concerning disposition of the property within 6 months the components become the property of the vehicle modifier who must dispose of the parts.
- 12.10 All modifications installed from a purchased kit must have detailed installation instructions to provide to the inspector so he can check the installation.

12.11 Additional mirrors may be added to the interior or exterior of the vehicle per recommendation by the Driving Evaluation Program. OEM mirrors must not be removed or moved per FMVSS 111.

12.12 A mileage log of each vehicle being modified must be maintained. All trips away from the facility of the vehicle modifier must be documented in this log, including the date, time and vehicle mileage at the exit and return to the facility. This log must be maintained from the time the vehicle is delivered to the vehicle modifier until the final delivery to the consumer (after all authorized modifications, all follow-up visits by the driving evaluator and all inspections have been completed).

**13. Final Inspection** - The completed vehicle must be inspected by the Designated Inspector for workmanship, appearance, and proper functioning of all equipment for compliance to these specifications.

13.1 The vehicle must not be presented to the inspector for approval until all authorized modifications have been completed and the follow-up checkout (if recommended) has been completed by the evaluator. An exception may be made when conditions or delays created by the consumer, the Evaluator, the Department of Rehabilitation, or the Designated Inspector occur subsequent to the completion of a significant portion of the authorized work. An inspection of the partially completed modification may be done to allow payment for the work done. This must be approved by the Rehabilitation Engineer for the Department of Rehabilitation.

13.2 Incomplete vehicles must not be approved for payment. If a vehicle which was originally sold as an incomplete vehicle is modified, it must be completed by a vehicle modifier certified by the National Highway Traffic Safety Administration to affix the completed vehicle label to the vehicle and have that label affixed to the vehicle.

13.3 Before the vehicle is signed off by the Designated Inspector, the vehicle modifier must sign the statement at the bottom of the Inspector Checklist presented by the Designated Inspector which states that all work on the vehicle complies with this document, all applicable Federal Motor Vehicle Safety Standards and follows NMEDA QAP Guidelines (if the vehicle modifier is NMEDA QAP certified).

13.4 Inspection of non-driving controls related adaptive equipment or previously accepted equipment will be conducted by the Designated Inspector with the approval of the Rehabilitation Engineer for the Department of Rehabilitation.

13.5 The vehicle must not be released to the consumer until all modifications authorized by the Department of Rehabilitation have been inspected and approved by the Designated Inspector, including signing the VEHICLE MODIFIER CERTIFICATION at the end of the Inspection Checklist.