

# **THE PORT AUTHORITY OF NY & NJ**

**OPERATIONS SERVICES DEPARTMENT  
CENTRAL AUTOMOTIVE DIVISION**

**PORT AUTHORITY TECHNICAL CENTER  
241 ERIE STREET, ROOM 307  
JERSEY CITY, NJ 07310**

**GROUND VEHICLE SPECIFICATIONS  
APPENDIX  
TO THE  
AIR TERMINAL RULES AND REGULATIONS**

**DATE: OCTOBER 2001**

**PREPARED BY THE  
CENTRAL AUTOMOTIVE DIVISION**

## INTRODUCTION

These *Ground Vehicle Specifications* are promulgated in support of *The Port Authority of New York and New Jersey Air Terminal Rules and Regulations*. They set forth the minimum specifications applicable to ground vehicles used at Port Authority Air Terminals and Heliports. These specifications are arranged as follows:

Chapter 1	General: Purpose and Applicability of Requirements
Chapter 2	Type 1 Vehicles: Requirements applicable to Highway Vehicles Used Exclusively in Public Areas, Operate With Federal or State License Plates
Chapter 3	Type 2 Vehicles: Requirements applicable to Highway Vehicles, Used in Public Areas and Controlled Areas, Operate With Federal or State and PA License Plates
Chapter Section 3A	Type 2 Vehicle requirements applicable to Air Terminal Buses, Used in Controlled Areas, Operate With State and PA License Plates
Chapter 4	Type 3 Vehicles: Requirements applicable to Highway Vehicles, Used in Controlled Areas Only, Operate With PA License Plates ONLY
Chapter 5	Type 4 Vehicles: General Requirements applicable to Air Operations Area Vehicles, Used in Public Areas and Controlled Areas, Operate With PA License Plates ONLY
Chapter Section 5A	Type 4 Vehicle requirements applicable to Mobile Lounges, Used in Controlled Areas, Operate With PA License Plates ONLY
Chapter Section 5B	Type 4 Vehicle requirements applicable to Air Operations Area Ground Maintenance Vehicles, Used in Public and Controlled Areas, Operate With State and PA License Plates ONLY
Chapter Section 5C	Type 4 Vehicle requirements applicable to Aircraft Refueling Hydrant Service Tow Carts, Operate With PA License Plates ONLY
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Chapter Section 5E	Type 4 Vehicle requirements applicable to Aircraft Refueling Tanker Vehicles, Operate With PA License Plates ONLY
Chapter Section 5F	Type 4 Vehicle requirements applicable to Automotive Refueling Tanker Vehicles, Operate With PA License Plates ONLY
Chapter Section 5G	Type 4 Vehicle requirements applicable to Other Types of Tanker Vehicles Transporting or Dispensing Fuel or Hazardous Material Products, Operate With PA License Plates ONLY
Chapter Section 5H	Type 4 Vehicle requirements applicable to Air Operations Area Ground Support, Motorized and Non-Motorized Vehicles, Used in Public and Controlled Areas, Operate With PA License Plates ONLY
Chapter Section 5I	Type 4 Vehicle requirements applicable to Air Operations Area Alternative Fueled Vehicles, Used in Controlled Areas, Operate With PA License Plates ONLY
Chapter 6	Type 5 Vehicles: Requirements applicable to Off-Highway, Construction, & Materials Handling, Vehicles, Used in Public and Controlled Areas, Operate With PA License Plates ONLY
Chapter 7	Type 6 Vehicles: Requirements applicable to Stationary Equipment, Used in Public and Controlled Areas, Operate With No PA License Plates

Nothing in these specifications shall relieve or replace any requirement for compliance with *The Port Authority of New York and New Jersey Air Terminal Rules and Regulations* under which these Specifications are issued. in the event of a conflict or variance between this document and *The Port Authority of New York and New Jersey Air Terminal Rules and Regulations*, the Air Terminal Rules and Regulations shall take precedence.

Nothing in these Specifications shall exempt vehicles, operators, or equipment from complying with the Federal Motor Vehicle Safety Standards, the Federal Motor Carrier Safety Regulations, the Motor Vehicle Laws of the State where the vehicle is registered or licensed, or other ordinances, rules or regulations which may govern the design, maintenance, or operation of such vehicles or equipment.

Vehicles may only be operated in the Air Terminal's controlled areas if they are in full compliance with Port Authority Air Terminal Rules and Regulations, they have been inspected and registered by the Port Authority, and have a properly installed and displayed PA License Plate. The PA registration and PA License Plate must be issued at the Air Terminal where the vehicle or equipment is operated. Vehicles registered by the Port Authority shall display such registration identification information, plates and placards at all times when operating on a Port Authority Air Terminal. Transfer of Port Authority licenses to other vehicles is forbidden.

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## **1. General Purpose and Applicability of Requirements**

### **1.1.Purpose**

The purpose of these specifications is to assure that ground vehicles used at Port Authority Air Terminals are designed and maintained to assure safe and efficient operations and a satisfactory level of patron services. These Ground Vehicle Specifications govern the design, operation, and maintenance of vehicles used on any portion of an Air Terminal including Air Cargo Handling Areas, Air Operations Areas, Air Terminal Highways, Air Terminal Exclusive Areas, Fuel Storage Areas, Port Authority Operated Areas, Public Aircraft Parking and Storage Areas, Public Areas, Public Cargo Ramp and Apron Areas, Public Landing Areas, Public Passenger Ramp and Apron Areas, Public Ramp and Apron Areas, and Public Vehicular Parking Areas. They set forth the minimum standards and requirements for all vehicles licensed by the Port Authority of NY & NJ for use in any portion of an Air Terminal.

### **1.2.Types of Vehicles**

For purposes of this document, vehicles are classified into six general categories as defined in the Air Terminal Rules and Regulations and duplicated in this section as follows:

#### **1.2.1. Type 1: Highway Vehicles Used Exclusively Outside The AOA And Operate With Federal or State License Plates**

Type 1 vehicles are used exclusively outside the AOA. These vehicles are highway vehicles that are registered with the State and have Federal or State License Plates. Type 1 vehicles are designed and manufactured to conform to Federal, State and local requirements, and are in conformance with CFR 49 Chapter V. They will have an affixed label or tag certifying compliance with appropriate regulations in effect at the date of manufacture and meet the requirements of the jurisdiction issuing the license plates. Examples of such vehicles include passenger cars, light, medium and heavy duty trucks, buses, trailers, and other mobile equipment.

**1.2.2. Type 2: Highway Vehicles Used Inside And Outside The AOA And Operate With Federal or State and PA License Plates**

Type 2 vehicles are used inside and outside the AOA. These vehicles are highway vehicles that are registered and have Federal or State License Plates and also have PA License Plates. These vehicles are designed and manufactured with same requirements as Type 1 vehicles. Examples of such vehicles include passenger cars, light, medium and heavy duty trucks, buses, trailers, and other mobile equipment.

**1.2.3. Type 3: Highway Vehicles Used exclusively Inside The AOA And Operate With PA License Plates ONLY**

Type 3 vehicles are used only inside the AOA, and may not operate outside the AOA. These units are highway vehicles that only have PA License Plates, and are not registered by the State or have Federal or State License Plates. These vehicles are designed and manufactured with same requirements as Type 2 vehicles. Examples of such vehicles include passenger cars, light, medium and heavy duty trucks, trailers, and any mobile equipment.

**1.2.4. Type 4: Air Operations Area Vehicles Used Inside And Outside The AOA And Operate With PA License Plates ONLY**

Type 4 AOA vehicles are of a specialized design that perform unique operational functions at the Air Terminal. These vehicles are used inside and outside the AOA as authorized by the Air Terminal Manager. These units are specialized vehicles that only have PA License Plates, and are not registered or have State License Plates. These vehicles are designed and manufactured to comply with applicable standards for the specific kind of vehicle or equipment operation or function. Examples include aircraft tow vehicles, baggage cart tow vehicles, aircraft refuelers, aircraft cargo loading equipment, ground power units or auxiliary power units, Air Terminal emergency response equipment, snow blowers and other special Air Terminal snow removal equipment.

**1.2.5. Type 5: Off-Highway, Construction, Materials Handling Vehicles Used Inside And Outside The AOA And Operate With State, PA, or No License Plates**

Type 5 vehicles are construction or material handling vehicles that perform unique operational functions. These vehicles may only be used inside and outside the AOA as authorized by the Air Terminal Manager. These vehicles are specialized vehicles that are not normally licensed, or, if licensed are licensed as “Construction Equipment,” “In-Transit,” “Transporter” or similar designations. These vehicles are designed and manufactured to comply with applicable standards for their specific category of vehicle or equipment. Examples include backhoes, loaders, fork lift trucks, cranes, excavators, paving equipment, and compressors.

**1.2.6. Type 6: Stationary Equipment Used Inside And Outside The AOA**

Type 6 units are stationary equipment that perform unique operational functions for supply of backup or emergency water, electrical, and other domestic services, and are permanently installed inside or outside the AOA. Installation and approval for use of such stationary equipment must be authorized by the Air Terminal Manager. Stationary equipment are designed and manufactured to comply with applicable standards for the specific category of equipment and type of use. Examples include backup and emergency generators, fire pumps, etc.

**1.3.Applicability**

These requirements apply to all vehicles that operate on any portion of an Air Terminal.

Vehicles in-service before the effective date of these regulations may continue to operate if they conformed to Air Terminal Rules & Regulations in effect at the time they were placed into service at an Air Terminal. However, maintenance, inspections, and out-of-service criteria detailed in these specifications shall apply to all vehicles, including those placed into service at an Air Terminal prior to the date of issue of these regulations.

Each specific type of vehicle or equipment that is permanently used at the Air Terminal shall meet all requirements specified in the subsequent chapters and/or chapter section for the specific type of vehicle or equipment.

#### **1.4.Incorporation by Reference**

Where reference is made to conformance with other standards, specifications, recommended practices, or industry consensus standards; the referenced items become a mandatory part of these specifications. Referenced material may be obtained from the Reference List found at the end of these specifications.

Whenever Federal or State requirements refer to interstate or intrastate transportation, such reference shall include any and all transportation through or within the Air Terminal. Whenever the requirements refer to carrier, such reference shall be the vehicle or equipment owner, operator, or lessee, or the person operating the vehicle if the owner, operator, or lessee is not designated. Whenever the requirements refer to the making of reports or giving of notices, such reference shall mean the giving of such report, within the time required by the requirement, to the Air Terminal Manager or representative. Whenever reference is made to a right of inspection by a person representing the Federal Highway Administration or the United States Department of Transportation, such right of inspection shall also include a Port Authority representative designated by the manager.

#### **1.5.Definitions**

Definitions are as contained in the Port Authority of NY & NJ Air Terminal Rules and Regulations, most currently effective.

#### **1.6.Changes To This Document**

The Director of Aviation may modify this document. All such modifications will be issued as addendum to these regulations.

#### **1.7.Variances or Waivers**

A variance or waiver to the requirements of these specifications may be granted by written request to the Air Terminal Manager. The request must include all of the following:

1. Company name, name and title of requestor, mailing address and telephone number of person to contact with respect to the waiver or variance application.
2. The specific requirement for which the waiver or variance is requested.
3. Explanation as to why the waiver or variance is necessary or desirable.

4. Alternate method of achieving the objective of the requirement, if practical.
5. Number of vehicles affected.
6. Effective time span for the waiver including specific start and end dates.

The request for a variance or waiver will be approved or denied in writing by the Air Terminal Manager.

### Classification of Vehicles Application Chart

Classification	Type of Vehicles	License Plates Required	*Air Terminal Authorized Areas	
			Outside AOA	Inside AOA
Type 1	Standard Production Highway	Federal or State Plates Only	Yes	No
Type 2	Standard Production Highway	Federal or State Plates <u>and</u> PA Plates	Yes	Yes
Type 3	Standard Production Highway	PA Plates Only	No	Yes
Type 4	Air Operations Area Vehicles	PA Plates Only	Yes	Yes
Type 5	Off-Highway, Construction, & Material Handling	State Plates, <u>or</u> PA Plates, <u>or</u> No Plates	*Yes	*Yes
Type 6	Stationary Equipment	No Plates	*Yes	*Yes

\* Requires Air Terminal Manager Approval.



## **2. Type 1 Highway Vehicles Used Exclusively Outside the AOA Operating With Federal or State License Plates**

Type 1 vehicles shall be in compliance with Federal, State, local, Public Utility Commissions, Consumer Affairs Division, or other appropriate regulatory bodies governing or having jurisdiction where the Air Terminal is located.

All type 1 vehicles shall not exceed the size, weight, and other dimensional requirements as required by the State where the Air Terminal is located. In addition, these vehicles shall be designed to have the proper weight distribution in all conditions of operational loading. Vehicles must also conform to Federal Bridge Formula limits. Vehicles shall also be designed and manufactured to operate and perform in compliance with all Federal requirements for the designated type of vehicle. They shall comply with Federal Motor Vehicle Safety Standards (FMVSS) 49CFR571 that certify the vehicle for use as a licensed vehicle for use on public streets and roads.

Type 1 vehicles shall be properly inspected, repaired, and maintained so that all of the vehicle's systems, parts, accessories, are in safe and proper operating condition. Wear limits and replacement criteria shall be in accordance with the manufacturer's published or regulatory agency recommendations. All vehicles shall be inspected and registered pursuant to State requirements for the State that issued the license plates.

All vehicles transporting hazardous materials shall meet the shipping, packaging, marking, labeling, placarding, handling, and transportation of hazardous materials consistent with regulations issued by the United States Department of Transportation, as promulgated in 49CFR. In addition, vehicles shall be inspected, repaired, and maintained as required by 49CFR390 and 49CFR397, and shall also comply with all requirements of 49CFR180.

All other commercial vehicles shall be equipped with all necessary systems and components so that they are operated by qualified operators and shall comply with Federal Motor Carrier Safety Regulations 49CFR390 to 49CFR395. Commercial vehicles shall be properly inspected, repaired, and maintained as required by 49CFR396. All vehicles shall be maintained so that all of the vehicle's systems, parts, accessories, including those specified in 49CFR393 and any additional parts and accessories which may affect safety of operation are in safe and proper operating condition.

### **3. Type 2 Highway Vehicles Used Outside and Inside the AOA Operating With Federal or State and PA License Plates**

Type 2 vehicles shall meet all Type 1 requirements, and the requirements set forth in this chapter.

#### **3.1.Company Name**

All vehicles, except designated unmarked vehicles, shall have a nameplate or lettering on each side listing the name of the owner, operator, or the approved logo of the owner or lessee.

#### **3.2.Emergency Equipment**

Commercial vehicles shall carry three bi-directional emergency reflective triangles. Flares are not permitted in vehicles operating in the controlled areas.

### **3A. Type 2 Air Terminal Buses Operating in the AOA With State and PA License Plates**

All air terminal buses shall comply with Federal Motor Vehicle Safety Standards 49CFR571 as applicable to buses, and shall be operated in compliance with Federal Motor Carrier Safety Regulations 49CFR390 to 49CFR397. All air terminal buses operating in the AOA shall meet all requirements listed in Chapter 5, entitled "Type 4 General Requirements for Air Operations Area Vehicles," and shall be in compliance with the requirements set forth in this chapter section.

#### **3A.1 Heating**

In addition to heating and defrosting requirements contained in Federal Motor Vehicle Safety Standard 103, every air terminal bus shall be equipped with a passenger heating system designed to provide adequate heat with distribution to all passenger carrying areas of the air terminal bus. The heater shall be sized to maintain an interior temperature of not less than 60°F with an outside ambient temperature of 0°F.

Open flame heaters or heat exchangers that introduce exhaust gases into or through the passenger compartment are forbidden. Heaters using gasoline, kerosene, or other liquid fuel must be of a type approved by Underwriter's Laboratories. Fuel lines for such heaters shall be routed outside the passenger compartment.

Heater that introduce heated outside air into the air terminal bus shall be designed so that the outside air is not mixed with exhaust gases, and the air shall not be drawn from, or circulate through, the engine compartment.

Heaters installed in the passenger compartment shall be braced to prevent shifting in case of accident and shielded to protect the driver and passengers. If possible, engine coolant or heater lines carrying hot liquids should not be routed through the passenger compartment. If routed through the passenger compartment such lines must be shielded to prevent water or steam from scorching occupants in the event of line, fitting, or component failure.

Heater electrical lines and components shall be circuit breaker protected to prevent fire in the event of a short or system failure.

### **3A.2 Air Conditioning**

All air terminal buses that transport patrons shall be equipped with air conditioning. The air conditioning system shall have adequate capacity to maintain a maximum interior temperature of 70°F with an ambient temperature of 100°F.

Air conditioners that introduce any outside air into the air terminal bus shall be designed so that the outside air is not mixed with engine exhaust gases, and the air shall not be drawn from, or circulate through, the engine compartment.

Air conditioner components installed in the passenger compartment shall be braced to prevent shifting in case of accident and shielded to protect the driver and passengers. When practical, refrigerant lines should not be routed through the passenger compartment. If routed through the passenger compartment such lines must be shielded to prevent refrigerant from spraying or contacting occupants in the event of line, fitting, or component failure.

Air conditioner electrical lines and components shall be circuit breaker protected to prevent fire in the event of a short or system failure.

### **3A.3 Windows**

All windows, other than emergency exit windows, in the passenger area shall be sealed and secured closed. Windows may be tinted or covered with wrapping material provided such tinting or wrapping is sufficiently transparent to allow passengers to see out the windows.

### **3A.4 Window Bars**

Except for those air terminal buses used to transport persons under confinement, window bars or metal coverings shall not be installed over windows in the passenger compartment.

### **3A.5 Entrance & Exit Doors**

All doors shall be designed and constructed to prevent accidental opening. All doors located behind the driver's seat shall be equipped with an audible or visible signal to warn the driver that the doors are open. All doors shall be equipped with emergency exit release handles that are protected from accidental activation.

### **3A.6 Emergency Exit Doors/Windows/Roof Hatches**

No air terminal bus is permitted to operate or remain in service unless the vehicle conforms to all requirements of Federal Motor Vehicle Safety Standard 217.

All emergency exit doors/Windows/Roof Hatches shall be maintained in proper operating condition and tested regularly. Doors and passages leading to any emergency exit shall not be obstructed.

### **3A.7 Entrances and Exits**

All air terminal buses shall have illumined entrance and exit step wells equipped with safety slip-resistant treads to prevent slipping. Air terminal buses used on non-illuminated ramps, aprons, taxiways or other areas shall be equipped with lighting to illuminate the ground in the area of the exit(s) or entrance(s).

### **3A.8 Handrails**

Handrails, handholds, stanchions, or grab handles shall be provided at all entrance and exit doors.

### **3A.9 Grounding**

The complete structure and all critical components shall be designed to eliminate build-up of static electric charges and shall be equipped with suitable grounding devices.

### **3A.10 High Idle Switches**

All high idle switches shall be designed to operate only when the transmission is in neutral.

### **3A.11 Interior**

The interior of all air terminal buses shall be lined to cover all body bows and body supports. No unnecessary projections, sharp edges, or jagged protrusions are permitted.

**3A.12 Interior Lights**

All air terminal buses shall be equipped with interior lights to give adequate illumination between each row of seats and they shall be shielded to minimize reflection and glare on the windshield that can interfere with the vision of the driver.

**3A.13 Partition**

All air terminal buses shall be equipped with a partition behind the driver. The driver shall not be completely isolated from the passenger compartment.

**3A.14 Seats**

All air terminal buses shall have all seats permanently fastened to the floor or walls. No portable seats are permitted in air terminal buses.

**3A.15 No-Smoking Sign**

All buses shall have a clearly visible sign reading "Smoking Prohibited."

**3A.16 Exhaust Systems**

The exhaust system of any air terminal bus shall not discharge any exhaust within fifteen (15) inches of any doors, windows, or any areas that may expose exhaust gases to the passenger compartment(s). The exhaust system shall not be designed with any flexible piping. The exhaust system must terminate within 6 inches of the rearmost part of the vehicle, and exhaust fumes should be directed rearward.

**3A.17 Tires**

All tires shall be properly rated when the air terminal bus is loaded to its rated GVWR. Re-grooved, recapped, or retreaded tires shall not be permitted. Radial and bias ply tires shall not be mixed on any bus.

**3A.18 Trailers**

Air terminal buses that have a full-trailer configuration design shall be limited to a maximum governed operating speed of 20 MPH. All trailer type designs shall include all necessary interlock systems to assure the safety of all passengers.

**3A.19 Ventilation**

All air terminal buses shall have a ventilation system that is capable of providing an adequate supply of fresh air throughout the passenger compartment. The air intake and exhaust vents for the ventilation system shall be located forward of the center of the passenger compartment and above the floor line unless the vents are part of an air conditioning or power exhaust system that operates constantly when the engine is running.

## **4. Type 3 Highway Vehicles Used in the AOA Only**

### **4.1. Operate With PA License Plates ONLY**

Type 3 vehicles shall meet all Type 1 and Type 2 requirements, and the requirements specified in this chapter.

All vehicles shall have a tag or label installed by the manufacturer certifying conformance to the applicable FMVSS in effect at the time of manufacture in accordance with 49CFR567.

The vehicles are not required to be inspected or registered by the State, but the operator or owner shall have a scheduled program to inspect and maintain the vehicles in accordance with 49CFR570 and all of its auxiliary systems in accordance with the vehicles or equipment manufacturer's recommendations.



## **5. Type 4 General Requirements for Air Operations Area Vehicles Used in Non AOA and in the AOA Operated With PA License Plates ONLY**

Type 4 vehicles shall be in compliance with the requirements specified in this chapter and the additional requirements specified in sub-chapter 5A-5L for the specific kind of vehicle or equipment operation or function. If sub-chapters 5A-5L regulates an item(s) listed in sections 5.1-5.16, the item(s) shall conform to the requirements of that subchapter.

### **5.1. Design Criteria**

Type 4 AOA vehicles must be designed for reliability and ease of operation. Manufacturers should assure that the principles of human engineering and ergonomics are designed into the functional controls of the vehicle. Minor component failures should not disable the vehicle or restrict it from accomplishing its primary function. Adequate redundancy should be built into all critical systems to assure that a single failure will not disable the vehicle. Whenever feasible, the preferred redundant mode should be mechanical. If mechanical means are not practical, the redundant mode should incorporate not more than one system and should be less complex than the primary operating system.

Exterior controls, handles, and operating devices should be designed to allow use by an operator wearing work gloves. Platform, steps, and access areas should be designed to allow an operator to wear work boots. Doors and access hoods should be designed to withstand winds and jet blast, should have adequate restraints to hold them in the open position without closing or falling on the operator, and must be equipped with latches or fasteners to secure them in the closed position.

Whenever possible, controls shall be identifiable as to correct positioning by logic of operation or have clear indications. Valves shall be marked as to open and closed positions, and whenever feasible, valves shall open when the control handles are in-line with the pipe or valve or the handles are turned in a counter clockwise direction.

Service points for commonly filled liquids such as fuel, motor oil, hydraulic oil, etc. should have the service points (dipsticks, service caps, etc.) identified by the use of contrasting color paint and labels indicating the appropriate service fluids and proper fluid level.

All fluid capacities that must be physically checked by the operator during pre-use inspections should be observable without the need to use tools and without requiring ladders, or other equipment.

Pilot lights or indicators shall be used for all controls or switches that do not provide positive indication of system operation to the operator. Warning lights or pilot lights should use color-coding to maximize operator's cognizance. Red indicators should indicate a serious malfunction or engagement of a primary operational function. Amber or yellow pilot lights or indicators should indicate a warning condition or engagement of a secondary operational function. Blue or green pilot lights should indicate informative indicators.

## **5.2. Size & Weight Limits**

Vehicles used in both controlled and public areas shall conform to federal, State and local size and weight regulations, including the Bridge Gross Weight Formula.

However, when vehicles appropriate for support operations, such as refueler tankers, the airport manager may approve larger sizes and weights as appropriate for effective operations and within the limits of the airport infrastructure. Approval for such exceptions must be submitted in writing to the Airport Manager and must include information regarding the proposed vehicle(s) or equipment, specifically including maximum gross weight, all fully laden axle weights, dimensions between axles, front and rear overhang, and information regarding turning circles, off-tracking, maximum speed and gradeability, and stopping performance, and other information regarding turning and maneuverability necessary to determine the ability of the unit(s) to operate without adverse effects to roadway and to adequately integrate with other airport traffic.

All vehicles that are used only in the AOA shall conform to weight limitations appropriate to the aircraft approved for use at the airport. Dimensions may be as appropriate for the intended operation, however maneuverability, turning diameter, wall-to-wall turning circle, acceleration, and stopping performance and other dimensions shall be such so as to not impede or interfere with other airport operations, and to allow for emergency removal or retrieval.

## **5.3. Tow Hooks/Eyes**

All AOA vehicles shall have heavy duty tow hooks, tow eyes, or other suitable toe connections attached to the front and rear of the vehicle. The tow hooks, eyes, or other suitable toe connections shall be attached to the frame or structure of the

vehicle, and provide adequate strength to allow pulling the vehicle for emergency recovery situations.

#### **5.4. Safety Interlocks/High Idle Switches**

Safety interlocks to prevent starting the engine unless the transmission is in neutral, or, the clutch is disengaged, shall be installed. High idle switches or throttle controls shall be designed to operate only when the transmission is in neutral.

#### **5.5. Power Take-Off (PTO) and Hydraulic Systems**

The PTO and associated equipment shall be designed and rated so that the system operates in accordance with the PTO and associated equipment manufacturer's recommendations. All driveshafts and joints shall be designed and installed to operate within the respective manufacturer's ratings. All hydraulic systems shall be designed and operated in accordance with the requirements specified in SAE ARP 1247, latest revision.

#### **5.6. Electrical Systems**

All vehicle wiring shall be in accordance with SAE J1292. All vehicle body electrical equipment, components, and wiring shall meet the requirements set forth in SAE ARP1247, latest revision.

The electrical system installed outside of the engine compartment or vehicle cab, including motors, electrical controls, electrical equipment and components, protective devices, and wiring, of all vehicles that handle, dispense, or transport hazardous materials, shall be of a proper design suitable for the Class, Division, and Group location for the product as defined in Article 500 of the National Electrical Code (NEC), NFPA 70. In addition, all electrical components and connections shall be made inside electrical enclosures. All driving motors, electrical controls, and electrical equipment shall be installed at a minimum height of 18 inches above the ground.

#### **5.7. Battery Main Disconnect Switch and Critical Circuits**

All vehicles or equipment that service aircraft that cannot be readily moved away from the aircraft shall be equipped with a main battery disconnect switch that completely disconnects battery power. This switch shall be located as close as possible to the battery and have its terminal connections enclosed so that they are protected from any product or fuel spills. Critical circuits that are required by the

vehicle or component manufacturer(s) to be powered directly off the battery, such as ECU's (Electronic Control Units), VIM's (Vehicle Interface Modules), etc., may be powered directly off the battery, but each circuit shall be protected by a properly rated fuse located as close as possible to the battery.

## **5.8. Vehicle Lights**

All vehicles shall be in full compliance with FMVSS 108 requirements.

## **5.9. Reflective Marking**

All vehicles shall be equipped with reflex reflectors or retroreflective stripping that marks the corner extremities of the vehicles visible from all directions (front, sides, and rear). The reflex reflectors shall meet SAE Class "A" requirements and retroreflective stripping shall conform to the requirements of ASTM D4956 latest revision, Standard Specification for Retroreflective Sheeting for Traffic Control.

## **5.10. Steering**

Steering equipped with power assistance shall revert to manual operation in the event of power assist system failure, or be equipped with a dual power steering system that operates in a fail-safe manner so that the failure of one system will not lead to a loss of steering.

## **5.11. Fire Extinguishers**

All vehicles equipped with fuel tank(s), hydraulic oil tank(s), or any flammable fuel tank(s) that have a combined volume of 200 gallons or more of flammable liquid shall be operated only if equipped with one 20 B:C: Purple K type fire extinguisher installed on the vehicle or equipment, or such a fire extinguisher is at a location readily accessible by ground personnel.

## **5.12. Flares**

No Type 4 vehicles shall carry flares or any other devices that are possible sources of ignition.

## **5.13. Driver's Visibility**

The vehicle shall be designed so that the driver has adequate visibility to the front, sides, and rear for safe operation of the vehicle. This requirement can be met with windows, a mirror system, or with CCTV camera(s) and screen(s). Exterior CCTV's, if used, must be designed to provide an image under low light conditions.

#### **5.14. Backup Alarm**

All vehicles that have limited rear view visibility and/or have a GVWR of 26,000 pounds or over and/or perform frequent backing shall be equipped with a backup alarm installed at the rear of the vehicle. The backup alarm shall be activated whenever the transmission is placed in reverse. The backup alarm shall be a SAE J994, Type B vehicle backup alarm.

#### **5.15. Marking of Controls**

Operating controls, light switches, and controls for auxiliary equipment shall be clearly and permanently marked, and permanently identified by identification plates. Signage setting forth necessary operating instructions shall be installed when required by Port Authority directive after inspection.

#### **5.16. Painting, Markings, and Lighting**

Vehicles shall be in compliance with all applicable FAA requirements including the latest revision of, or successor to, FAA Advisory Circular #150-5210-5b "Painting, Markings, and Lighting of Vehicles Used on an Air Terminal."

## **5A. Type 4 Mobile Lounges**

All mobile lounges shall comply with Federal Motor Vehicle Safety Standards 49CFR571 as applicable to buses, OSHA requirements where practical, SAE Aerospace Recommended Practice (ARP) 1247, and shall be operated in compliance with Federal Motor Carrier Safety Regulations 49CFR390 to 49CFR397. Mobile lounges shall meet all requirements listed in Chapter 5, entitled “Type 4 General Requirements for Air Operations Area Vehicles,” and they shall also be in compliance with the requirements set forth in this subchapter.

### **5A.1. Steering**

Steering shall be a dual power steering system to operate in a fail-safe manner so that the failure of one system will not lead to a loss of steering.

### **5A.2. Brakes**

The braking system shall be a dual power assisted type designed to operate in a fail-safe manner so that no single failure will result in the loss of vehicle braking. The fail-safe design shall be such that partial system operation will not adversely affect directional control of the vehicle with partial brake system operation. The brake system shall be designed and maintained to provide adequate retardation, as specified by the vehicle manufacturer to bring the vehicle to a controlled stop, and to not allow the vehicle to roll or move with total loss of system power.

### **5A.3. Deadman Control**

The vehicle shall be equipped with a deadman system that applies the vehicle's parking brakes to stop the vehicle whenever the operator releases the deadman control during vehicle operation. The deadman system may utilize the vehicle's service brakes provided the brakes are applied at a controlled rate.

#### **5A.4. Elevation & Descent System**

The elevation and descent system shall be designed to operate in a fail-safe manner, so that no single failure of any component will cause the pod to descend or elevate unexpectedly.

#### **5A.5. Emergency Descent**

The elevation and descent system shall be equipped with an emergency descent system to permit lowering the passenger carrying pod at a controlled rate of descent in the event of power loss or the failure of the main elevating and descent system(s). Controls to operate the emergency descent system shall be located both at the operator's station in the pod and on the control panel on the lower chassis of the vehicle, for access by ground personnel.

#### **5A.6. Emergency Exit Stairs**

The pod shall be equipped with stairs or slides with an emergency release mechanism capable of being operated from inside or outside the unit with the stair or slide in any position from fully lowered to fully raised.

#### **5A.7. Fire Extinguishers**

Two fully charged fire extinguishers with a minimum 10 A:B:C rating shall be installed in the passenger carrying pod. The fire extinguishers shall be UL rated and be mounted readily accessible for use.

One fully charged 20 B:C: Purple K type extinguisher shall be mounted on the chassis at a location readily accessible by ground personnel.

#### **5A.8. Engine Fire Detection & Suppression**

Each engine(s) compartment(s) shall be equipped with a fire detection and suppression system. The detection system shall be designed to provide both visual and audible feedback to the driver, and at the ground level. This fire suppression system shall be designed to rapidly knock down and extinguish fires in the engine compartment. The fire suppression system shall be capable of manual discharge both from the driver's seat and from the ground and automatic discharge.

**5A.9. Radio**

Mobile lounges shall be equipped with a two-way radio capable of being tuned to the Air Terminal Ground Control frequency.

**5A.10. PA System**

Mobile lounges shall be equipped with a public address system to permit the driver or attendant to provide advisory and instructional information to the passengers. Jacks and headsets shall also be available at the ground position to allow the operator to communicate with ground personnel.

**5A.11. Driver's Visibility**

The mobile lounge driver must have adequate visibility to front, sides, and rear to drive the mobile lounge, and to observe the interior of the passenger pod. These requirements can be met with a mirror system adjustable from the driver's seat and with CCTV camera(s) and screen(s). Exterior CCTV's must be designed to provide an image under low light conditions.



## **5B. Type 4 Air Operations Area Ground Maintenance Equipment**

To the extent vehicles have systems or features regulated by such bodies, all ground maintenance vehicles shall be in compliance with Federal, State, Local, bodies having jurisdiction in the area in which the Air Terminal is located. All ground maintenance vehicles shall be in full compliance with applicable FMVSS as much as practical, all ANSI and OSHA requirements, and any applicable FAA requirements. In addition to compliance with the above, all vehicles shall also meet applicable industry consensus standards (ANSI, ASTM, NFPA) and the specific requirements set forth herein.

### **5B.1. Elevated Mechanism Safety**

The elevation and descent mechanisms of all ground maintenance equipment shall provide a means to protect against inadvertent dropping of lifted components that may be in a raised position for normal servicing or adjusting. Any cutters installed on lifting mechanisms shall be designed to stop as soon as they leave the ground.

### **5B.2. Engine Safety Shutdown**

All self-propelled ground maintenance equipment equipped with cutters or tillers that are designed to move when the machine is stationary shall be equipped with a control switch designed to stop cutter or tiller movement when the operator leaves his station.

### **5B.3. Flashing Warning Lamp**

All self-propelled ground maintenance equipment shall be equipped with a flashing warning lamp that is in compliance with SAE J974.

**5B.4. Rearview Mirror**

All ground maintenance equipment with an enclosed cab shall be equipped with a minimum of one rearview mirror or two side view mirrors to permit the operator to see behind the machine.

**5B.5. Seatbelts**

All ground maintenance equipment with rollover protection shall be equipped with seatbelts installed at each seating position.

**5B.6. Shielding**

The following parts shall be shielded or in a protected location to prevent operator injury: Moving traction elements; revolving engine components; pinch points or run-on points of exposed gears, belts, chain drives, and idlers; outside faces of pulleys, sheaves, sprockets, and gears on drives that rotate when the engine is running with all clutches disengaged; revolving parts with projections such as exposed bolts, keys, or set screws; revolving shafts except, smooth shaft ends protruding less than one-half the diameter of the shaft including its locking means; ground driven components, if operating personnel are exposed to them while the drivers are in motion; surfaces hot enough to cause personal injury during normal operation or servicing; functional components, such as snapping or husking rolls, straw spreaders and choppers, cutterbars, flail rotors, rotary beaters, augers, feed rolls, rotary tillers, and similar units which must be exposed for proper function shall be shielded to the maximum extent permitted by the intended function of the component(s).

**5B.7. Slow Moving Vehicle Emblem**

All self-propelled ground maintenance equipment shall be equipped with a slow moving vehicle identification emblem that conforms to SAE J943a.

## **5C.Type 4 Aircraft Refueling Hydrant Service Tow Carts**

To the extent that vehicles have systems or features regulated by such bodies all aircraft refueling hydrant service tow carts shall be in compliance with Federal, State, Local, bodies having jurisdiction in the area in which the Air Terminal is located. Specifically, all hydrant service tow carts shall be in compliance with Federal 49CFR Chapter V and 49CFR393, ATA Specification 103, SAE Aerospace Recommended Practice (ARP) latest revised document on “Specifications for Hydrant Service Tow Carts,” NFPA 407, and with any other applicable FAA requirements. Compliance with the Federal and State requirements shall be limited to the extent that the vehicles are to operate as typical aircraft refueling tow carts as typically used at other major Air Terminals and meeting the specific requirements stipulated herein. The tow carts shall also meet all requirements listed in Chapter 5, entitled “Type 4 General Requirements for Air Operations Area Vehicles.” in addition, they shall be in compliance with the requirements set forth in this chapter section.

### **5C.1. Aircraft Refueling System Design**

The refueling system shall be equipped with a primary and secondary pressure limiting system and a flow limiting control system. The primary pressure control system shall utilize a pressure control valve that is either an integral part of either the hydrant coupler or the hydrant pit valve. The secondary pressure control system shall utilize a pressure control valve located in the refueling system onboard the tow cart. The fueling control system shall be activated and deactivated by a deadman system. When the control system is activated, fuel shall be pumped from the hydrant system through the control and filtration systems and then to the dispensing nozzle(s) in a fail-safe and controlled manner. The control system shall regulate and limit the fueling pressure at all nozzles and the dispensing flow rate at preset settings.

The pressure control system shall be controlled by regulating devices to sense fuel pressure at the nozzles. The control system shall limit the product pressure at any nozzle when fueling at any flow rate from zero to maximum flow and during any shutdowns. The system shall be designed so that any desired nozzle pressure limitation can be selected and maintained with a pressure accuracy at the nozzle as listed in the paragraph entitle “Aircraft Refueling System Operation and Performance.”

### **5C.2. Aircraft Refueling System Operation and Performance**

The refueling system shall be set to operate so that the primary pressure control system controls and limits the fueling pressure to a maximum limit of 40 psi and the secondary pressure control system controls and limits the fueling pressure to a maximum limit of 50 psi at the dispensing nozzle(s). The secondary system shall perform the controlling function when the primary control system becomes inoperative. The system shall perform the refueling function in a stable manner controlling the fueling pressure within  $\pm 4$  psi when fueling less than 150 gpm and  $\pm 2$  psi when fueling at 150 gpm and at higher flows, and without excessive hunting. Systems that hunt to the point where the system recycles, stopping and starting with all manual valves in the full open position, shall not be used. The fuel control system shall also be designed so that the maximum momentary surge pressure in the fueling manifold of the aircraft (as measured directly downstream of the nozzle connections) does not exceed 120 psi when fueling at any flow conditions including at full rated flow and the fueling is stopped within 1 second, with any arrangement of nozzles used. To assure that the fueling system does not exceed a surge pressure limit, the system shall be periodically tested when fueling at a minimum of three different flow conditions, including fueling with a flow with a manifold back pressure of 0 PSI (providing rated flow rate), 25 PSI, and 40 PSI (or lower if the limited pressure setting is lower). The control system shall also limit the fueling system static pressure to a maximum lock-in pressure of 70 psi measured at the fueling underwing nozzle(s). The system and its accuracy shall be fully tested and properly documented on test sheets by the tow cart manufacturer, and operator when periodically testing.

### **5C.3. Aircraft Authorized Fueling and Quality Control**

Tow carts shall fuel at the limiting fueling pressure, flow, surge pressure, filtration requirements, etc. as required by the aircraft manufacturer and the airline, whichever requires more stricter requirements. The complete refueling system, including the control systems and fuel quality, shall be checked, inspected, and tested in accordance with ATA Specification 103 and any additional requirements requested by the airlines. All Jet fuel dispensed shall conform to ASTM D-1655 and ATA Specification 103 requirements, latest revisions.

### **5C.4. Testing and Certification**

Each tow cart shall be fully tested by the manufacturer to assure that it is equipped with all components and systems to safely operate and to assure that the unit meets all other requirements of these specifications. All safety features shall be tested and results documented. Each tow cart shall have a label or tag affixed

to it certifying compliance with all applicable 49CFR requirements, SAE ARP 1247, AIR 1375, and ARP document on “Specifications for Hydrant Service Tow Carts” latest revisions, NFPA 385 and 407, ATA Specification 103, that are in effect at the date of manufacture. In addition, each tow cart shall be labeled by the final-stage manufacturer as required by 49CFR568.

#### **5C.5. Inspection and Maintenance**

All tow carts shall be inspected, repaired, and maintained as required by 49CFR396. All of the tow cart’s systems, parts, accessories, shall be properly inspected and maintained in safe and proper operating condition. Wear limits and replacement criteria for all systems and components shall be in accordance with the manufacturer’s published recommendations.

The hydrant service tow cart system shall receive daily and periodical checks, inspections, and tests performed in accordance with ATA Specification 103, ARP, and as required by these specifications. All tests shall be properly documented.

#### **5C.6. Trailer**

All tow carts shall be equipped with a manufacturer’s commercial-type full-trailer with parking brakes, properly rated for the application and service requirements. The trailer shall have a minimum gross weight rating (GWR) as required for the weight of the laden aircraft refueling system, with a proper weight distribution. The trailer shall meet all FMVSS requirements and be certified in accordance with 49CFR568.

The tow cart shall be equipped with a drawbar designed so that it is hinged and held in vertical position by a suitable locking holding device when not in use, and the drawbar shall have a maximum height of six (6) feet above the ground when in the vertical position.

The trailer shall be equipped with positive locking parking brakes, a lunette eye, safety chains, and an electrical connector. If the trailer is equipped with service brakes, it shall be equipped with a breakaway switch and battery installed in a sealed protective battery box.

#### **5C.7. Engines**

The tow cart’s engine shall be located in a self-contained engine compartment, independent of the refueling system, and be covered so that any fuel leakage during aircraft fueling operation does not fall on any part of the engine. The engine compartment shall be fully ventilated and be accessible for fire suppression.

**5C.8. Exhaust System**

The tow cart's exhaust system shall be designed so that it directs and discharges down and away from the operator and fueling system. The exhaust system piping and components shall not extend below any refueling system piping or components and it shall be covered with shield(s) that divert any product away from the exhaust. All exhaust piping shall be a minimum of 12 inches away from any product piping, hoses, tanks, etc. All tow carts shall be equipped with a spark arrestor.

**5C.9. Vehicle Lights**

All tow cart body light systems shall be vapor-proof type lights and sealed (vaporproof) wiring systems.

**5C.10. Product Filter-Separator and Filter Monitor**

The refueling system shall be equipped with a filter-separator, a monitor, or both, rated for a minimum of 5% higher than the refueling capacity of the vehicle. The filter-separator and monitor may be a single vessel with their elements combined in one unit. The filter-separator and/or monitor shall be installed so all fuel dispensed passes through the unit. The filter-separator and monitor shall meet all API, IP, or API/IP latest requirements. The filter-separator and/or monitor system shall be properly designed with necessary components to automatically and continuously eliminate any entrapment of air in any part of the system. In addition, the filter-separator shall be equipped with a vacuum breaker and air purge valve for draining and properly filling the vessel.

The filtration system(s) elements shall be properly rated for the pressure and flow requirements that it may be exposed to with the possible failure of any system component(s).

**5C.11. Hydrant Coupler and Nozzles**

The hydrant coupler and all nozzles shall be equipped with holders and each holder shall be equipped with a sensing unit that senses when the hydrant coupler and nozzles are stored and operate with the interlock system function.

**5C.12. Product Piping, Components, and Hose Couplings Materials**

All product piping, components and hose coupling materials shall be compatible with the fuel carried therein. All piping and components that retain, convey, or handle the dispensing of fueling product shall be free of copper, brass, lead, and zinc. All dispensing piping shall be of either aluminum or 300-series stainless steel construction throughout, including all bolts, nuts, and washers that are in contact with the dispensing fuel. All hoses downstream of the first filtration system including Jac Risor hoses, shall be stainless steel and meet all requirements of API Standard 1529, latest revision, for its application, except that dispensing hose couplings may be brass, meeting all requirements of API Standard 1529, latest revision. The filter-separator or filter-separator/monitor may be carbon steel and shall be epoxy coated in compliance with all latest API requirements. The filter-monitor shall be aluminum or stainless steel, and meet all latest IP requirements.

**5C.13. Tanks, Piping, and Component Drains**

All tanks that handle the product on the tow cart and all piping shall be equipped with drains to permit complete drainage. Components that cannot be drained through the tank or piping shall also be equipped with drains. All sump drain lines shall be of a rigid metallic material capable of handling the product. All drain lines shall extend to the side of the tow cart and be grouped together as practical in an accessible area, be protected with structural framework, and be properly labeled. The end of the sump drain lines shall be equipped with manually operated drain ball valve with downspouts that drain the product down with minimal splashing. The end of the spouts shall be equipped with quick connecting caps or plugs secured to the tow cart.

**5C.14. Hoses and Hose Certificates**

All hoses on the tow cart shall be in compliance with API Standard 1529 for its application and each hose shall have a certificate certifying compliance with all NFPA 407 requirements.

**5C.15. Battery Main Disconnect Switch**

All tow carts shall be equipped with a battery main disconnect switch that completely disconnects battery power. Battery powered or engine powered tow carts shall be equipped with a vapor-proof battery disconnect switch. This switch shall be located as close as possible to the battery and have its terminal connections enclosed so that they are protected from any product or fuel spills.

Critical circuits that are required by the tow cart or component manufacturer(s) to be powered directly off the battery, such as ECU's (Electronic Control Units), may be powered directly off the battery, but each circuit shall be protected by a properly rated fuse located as close as possible to the battery.

#### **5C.16. Fire extinguishers**

All tow carts shall be equipped with two (2) fully charged Purple-K 20 B:C fire extinguishers readily accessible from the ground. One fire extinguisher shall be installed on each side of the tow cart. If the extinguishers are protected from the elements by covers, the extinguisher locations shall be clearly marked by labels consisting of two(2)-inch-high letters in contrasting colors.

#### **5C.17. Hydrant Pressure Control**

If the hydrant at the connecting point is not equipped with a pressure limiting valve, the refueling system shall be equipped with a pressure control coupler and it shall operate as the primary pressure control valve.

#### **5C.18. Hydrant Excess Flow Shutdown Control**

If the hydrant at the connecting point is not equipped with an excess flow shutdown, the tow cart shall be equipped with a coupler that is equipped with an excess flow shutdown. The excess flow control shall be set at a flow rate that is approximately 50 gpm higher than the flow rate setting of the tow cart.

#### **5C.19. Auxiliary Air System**

The auxiliary air system of tow carts equipped with air brakes shall fill with air only when the tow cart's air brake system has an air pressure of 65 psi or higher.

#### **5C.20. Fuel Recovery Tank System**

All hydrant service vehicles shall be equipped with a fuel recovery tank to collect fuel from air eliminators, pressure relief systems, product vents, etc. The tank and system components shall be designed to operate in all system-vacuum- and working-pressure- operating conditions. The tank shall be equipped with an inspection cover which shall be either securely tightened or be lockable. The fuel recovery tank shall be equipped with one of the following systems:



- A. Shutdown System: A system that disables the fueling system (including the deadman system) whenever the fuel recovery tank is filled to a level of approximately  $\frac{3}{4}$  full or more.
- B. Automatic Recirculation System: A system that automatically empties the fuel recovery tank whenever the tank is filled to a level of approximately  $\frac{3}{4}$  full and recirculates the product upstream of the filtration system. This system requires that all components meet all requirements specified in paragraph entitled "Product Piping, Components, and Hose Coupling Materials."

### **5C.21. Interlock/Deadman System**

Tow carts shall be equipped with a safety interlock system that automatically applies the cart's parking or service brakes in a consistently controlled manner and allows the refueling system to be operational only when the interlock system is activated.

The deadman system shall be designed so that the deadman is operational only when the refueling system is operational.

- A. The tow cart's parking or service brakes shall automatically be applied, and shall be prevented from release when any of the following conditions exist:
  - 1. The hydrant coupler is removed from its storage holder.
  - 2. Any nozzle is removed from its storage holder.
  - 3. If equipped with a lift, the lift platform is raised from the full down position. in addition, the lift raising system shall not be operational unless the parking or service brakes are applied.
  - 4. If equipped with folding platform handrails, the handrails are raised from the full down or locked position.
  - 5. The tow bar is in the full up position.
  - 6. The cart's rear service brake lights shall turn "on" when the unit is in-transit and the cart's parking or service brakes are applied by any of the above conditions.

- B.** The refueling system shall be operational only when all of the following conditions exist:
1. The cart's parking brakes are applied.
  2. If the interlock system utilizes the cart's service brakes, the service brakes are applied.
  3. All emergency shut-off valves are in the deactivated position.
  4. If the refueling system is equipped with a filter-separator, the water sump control valve is deactivated.
  5. If the cart is equipped with a recovery tank shutdown system, the fuel level in the recovery tank is  $\frac{3}{4}$  of the tank capacity or less.
- C.** The cart's service brakes shall not be released and the cart's parking brakes shall not be capable of being released unless all of the following conditions exist:
1. The hydrant coupler is stored in its storage holder.
  2. All hose nozzles are stored in their storage holders.
  3. If equipped with a lift, the lift platform is fully lowered to the down position.
  4. If equipped with folding platform handrails, the handrails are lowered to the full down or locked position.
  5. The tow bar is lowered from the full up position.
- D.** The refueling system shall not be operational when any of the following conditions exist:
1. The cart's parking brakes are released.
  2. If the interlock system utilizes the cart's service brakes, the service brakes are released.
  3. Any emergency shut-off valve is activated.
  4. If the refueling system is equipped with a filter-separator, the water sump control valve is activated.
  5. If the vehicle is equipped with a recovery tank shutdown system, the fuel level in the recovery tank is more than  $\frac{3}{4}$  of the tank capacity.
- E.** The cart's engine shall shutdown and its starting circuit shall open so that the engine cannot be started when the conditions listed in A1 to A4 above

exist, and the engine will start and run only when the conditions in C1 to C4 above exist.

- F.** For emergency situations, the vehicle shall be equipped with an interlock override valve or switch located on the front left side of the cart. The interlock override shall disable the refueling system and allow the operator to override the interlock system. The interlock override shall be safety wired in the deactivated position and be properly labeled “Interlock Override” with ¾ inch letters. The interlock override system shall operate as follows:
  - 1.** Override the conditions listed in E above and allow the operator to start the engine.
  - 2.** Override the conditions listed in A1 to A5 above and release the vehicle’s service brakes or allow the operator to release the parking brakes.
  - 3.** Deactivate the refueling system, disabling the deadman.
  - 4.** The cart’s 4-way flashers operate when the interlock override is activated.
  
- G.** Carts with air brakes shall be equipped with an air chuck installed on the control panel to allow filling its air reservoirs to release the brakes in the event that the air system is depleted. The brakes shall also be equipped for mechanical release using the method established by the cart’s manufacturer.

#### **5C.22. Material Prohibited**

Magnesium shall not be used on any refueling tow cart.

#### **5C.23. Storage Cabinets**

Cabinets used only to store paperwork may be waterproof. Storage cabinets for storage of any equipment or parts shall have ventilated floors to prevent accumulation of vapors and spilled liquids.

**5C.24. Electric Powered Tow Carts**

Tow carts equipped with an electric propulsion system shall be equipped with a properly ventilated propulsion compartment and a separate battery compartment. All driving motors, electrical controls, and electrical equipment for the propulsion system shall be located in the propulsion compartment and all electrical connections shall be protected with rubber boots, or sealed with a non-conductive material. All driving motors, electrical controls, and electrical equipment shall be installed at a minimum height of 18 inches above the ground. All driving motors, electrical controls, and electrical equipment shall be of a design suitable for Class I, Division 1, Group D locations as defined in Article 500 of the National Electrical Code (NEC), NFPA 70. The battery compartment of an electrically powered refueling tow cart shall be fully insulated by a non-conductive lining and electrical leads shall be firmly fastened on insulated blocks to prevent short circuits. All other electrical systems shall meet all applicable NEC and NFPA 407 requirements.

## **5D. Type 4 Aircraft Refueling Hydrant Service Vehicles**

All aircraft refueling hydrant service vehicles shall be in compliance with Federal, State, Local, and other appropriate regulatory bodies having jurisdiction in the area in which the Air Terminal is located, including Federal 49CFR Chapter V and 49CFR393, ATA Specification 103, SAE Aerospace Information Report (AIR) 4974 latest revision, NFPA 407, and with any other applicable FAA requirements. Compliance with the Federal and State requirements shall be limited to the extent that the units are to operate as typical aircraft refueling vehicles as typically used at other major Air Terminals and require meeting the specific requirements stipulated herein. The hydrant service vehicles shall meet all requirements listed in Chapter 5, entitled “Type 4 General Requirements for Air Operations Area Vehicles.” They shall also be in compliance with the requirements specified in this sub-chapter.

### **5D.1. Aircraft Refueling System Design**

The refueling system shall be equipped with a primary and secondary pressure limiting and a flow limiting control system. The primary pressure control system shall utilize a pressure control valve that is either an integral part of either the hydrant coupler or the hydrant pit valve. The secondary pressure control system shall utilize a pressure control valve located in the refueling system on board the vehicle. The fueling control system shall be activated, and deactivated by a deadman system. When the control system is activated fuel shall be pumped from the hydrant system through the control and filtration systems and then to the dispensing nozzle(s) in a fail-safe and controlled manner. The control system shall regulate and limit the fueling pressure at all nozzles and the dispensing flow rate at preset settings.

The pressure control system shall be controlled by regulating devices to sense fuel pressure at the nozzles. The control system shall limit the product pressure at any nozzle when fueling at any flow rate from zero to maximum flow and during any shutdowns. The system shall be designed so that any desired nozzle pressure limitation can be selected and maintained with a pressure accuracy at the nozzle as listed in the paragraph entitled “Aircraft Refueling System Operation and Performance.”

### **5D.2. Aircraft Refueling System Operation and Performance**

The refueling system shall be set to operate so that the primary pressure control system controls and limits the fueling pressure to a maximum limit of 40 psi and the secondary pressure control system controls and limits the fueling pressure to a maximum limit of 50 psi at the dispensing nozzle(s). The secondary system shall

perform the controlling function when the primary control system becomes inoperative. The system shall perform the refueling function in a stable manner controlling the fueling pressure within  $\pm 4$  psi when fueling less than 150 gpm and  $\pm 2$  psi when fueling at 150 gpm and at higher flows, and without excessive hunting. Systems that hunt to the point where the system recycles, stopping and starting with all manual valves in the full open position, shall not be used. The fuel control system shall also be designed so that the maximum momentary surge pressure in the fueling manifold of the aircraft (as measured directly downstream of the nozzle connections) does not exceed 120 psi when fueling at any flow conditions including at full rated flow and the fueling is stopped within 1 second, with any arrangement of nozzles used. To assure that the fueling system does not exceed a surge pressure limit, the system shall be periodically tested when fueling at a minimum of three different flow conditions, including fueling with a flow with a manifold back pressure of 0 PSI (providing rated flow rate), 25 PSI, and 40 PSI (or lower if the limited pressure setting is lower). The control system shall also limit the fueling system static pressure to a maximum lock-in pressure of 70 psi measured at the fueling underwing nozzle(s). The system and its accuracy shall be fully tested and properly documented on test sheets by the tow cart manufacturer, and operator when periodically testing.

### **5D.3. Aircraft Authorized Fueling and Quality Control**

The hydrant service vehicles shall fuel only those aircraft that they are authorized to fuel. The authorized vehicles shall fuel at the limiting fueling pressure, flow, surge pressure, filtration requirements, etc. as required by the aircraft manufacturer and the airline, whichever requires more stricter requirements. The complete vehicle refueling system, including the control systems and fuel quality shall be checked, inspected, and tested in accordance with ATA Specification 103 and any additional requirements requested by the airlines. All Jet fuel dispensed shall conform to ASTM D-1655 latest revision and ATA Specification 103 requirements.

### **5D.4. Testing and Certification**

Each hydrant service vehicle shall be fully tested by the manufacturer to assure that it is equipped with all components and systems to safely operate under all extreme conditions encountered in normal operation and to assure that the unit meets all other requirements of these specifications. All tests and safety features shall be properly tested and documented. Each hydrant service vehicle shall have a label or tag affixed to it certifying compliance with all applicable 49CFR requirements, SAE ARP 1247, AIR 1375, and AIR 4974 latest revisions, NFPA 385 and 407, ATA Specification 103, that are in effect at the date of manufacture. In addition, each hydrant service vehicle shall be labeled by the final-stage manufacturer as required by 49CFR568.

**5D.5. Inspection and Maintenance**

All hydrant service vehicles shall be inspected, repaired, and maintained as required by 49CFR396. All of the vehicle's systems, parts, accessories, shall be properly inspected and maintained in safe and proper operating condition. Wear limits and replacement criteria for all systems and components shall be in accordance with the manufacturer's published recommendations.

The complete vehicle refueling system shall have daily and periodical checks, inspections, and tests performed in accordance with ATA Specification 103, SAE AIR 4974, and as required by these specifications. All tests shall be properly documented.

**5D.6. Cab-Chassis**

All vehicles shall be equipped with a cab-chassis properly rated for the application and service requirements. The cab-chassis shall meet all FMVSS requirements and be certified in accordance with 49CFR568.

**5D.7. Engines**

The vehicle's propulsion engine shall be installed underneath or in front of the cab, and be covered so that any fuel leakage during aircraft fueling operation does not fall on any part of the engine. The engine compartment shall be fully ventilated and be accessible for fire fighting.

**5D.8. Exhaust System**

The vehicle's exhaust system shall be designed so that it directs and discharges exhaust gases downward at the front right side of the vehicle. Minimal exhaust system piping and components shall extend behind the cab, and any piping or components that extend behind the cab shall be covered with a shield that diverts any product away from the exhaust. All vehicles shall be equipped with a spark arrestor.

**5D.9. Vehicle Lights**

The cab of the vehicle may be equipped with the manufacturer's standard lights. The body of the hydrant service vehicles shall be equipped with vapor-proof type lights and sealed (vaporproof) wiring systems.

#### **5D.10. Product Filter-Separator and Filter Monitor**

The refueling system shall be equipped with either a filter-separator, monitor, or both, rated for a minimum of 5% higher than the refueling capacity of the vehicle. The filter-separator and monitor may be a single vessel with their elements combined in one unit. The filter-separator and/or monitor shall be installed so all fuel dispensed passes through the unit. The filter-separator and monitor shall meet all API, IP, or API/IP latest requirements. The filter-separator and/or monitor system shall be properly designed with necessary components to automatically and continuously eliminate any entrapment of air in any part of the system. In addition, the filter-separator shall be equipped with a vacuum breaker and air purge valve for draining and properly filling the vessel.

The filtration system(s) elements shall be properly rated for the pressure and flow requirements that it may be exposed to with the possible failure of any system component(s).

#### **5D.11. Hydrant Coupler and Nozzles**

The hydrant coupler and all nozzles shall be equipped with holders and each holder shall be equipped with a sensing unit that senses when the hydrant coupler and nozzles are stored and operate with the interlock system function.

#### **5D.12. Product Piping, Components, and Hose Coupling Materials**

All product piping, components, and hose coupling materials shall be compatible with the fuel carried therein. All piping and components that retain, convey, or handle the dispensed fuel shall be free of copper, brass, lead, and zinc. All dispensing piping shall be of either aluminum or 300-series stainless steel construction throughout, including all bolts, nuts, and washers that are in contact with the dispensing fuel. All hoses downstream of the first filtration system, including Jac Risor hoses, shall be stainless steel and meet all requirements of API Standard 1529 latest revision, for its application, except that dispensing hose couplings which may be brass meeting all requirements of API Standard 1529 latest revision. The filter-separator or filter-separator/monitor may be carbon steel and shall be epoxy coated in compliance with all latest the API requirements. The filter-monitor shall be aluminum or stainless steel and meet all the latest IP requirements.



**5D.13. Tanks, Piping, and Component Drains**

All tanks that handle the product on the vehicle and all piping shall be equipped with drains to permit complete drainage. Components that cannot be drained through the tank or piping shall be equipped with drains. All sump drain lines shall be of a rigid metallic material capable of handling the product. All drain lines shall extend to the side of the vehicle and be grouped together as practical in an accessible area, be protected with structural framework, and be accurately labeled. The end of the sump drain lines shall be equipped with manually operated drain ball valve with downspouts that drain the product down with minimal splashing. The end of the spouts shall be equipped with quick connecting caps or plugs secured to the vehicle.

**5D.14. Hoses and Hose Certificates**

All hoses on the vehicle shall be in compliance with API Standard 1529 for its application and each hose shall have a certificate certifying compliance with all NFPA 407 requirements.

**5D.15. Battery Main Disconnect Switch**

All vehicles shall be equipped with a battery main disconnect switch that completely disconnects battery power. This switch shall be located as close as possible to the battery and have its terminal connections enclosed so that they are protected from any product or fuel spills. Critical circuits that are required by the vehicle or component manufacturer(s) to be powered directly off the battery, such as ECU's (Electronic Control Units), VIM's (Vehicle Interface Modules), etc., may be powered directly off the battery, but each circuit shall be protected by a properly rated fuse located as close as possible to the battery.

**5D.16. Fire Extinguishers**

All vehicles shall be equipped with two (2) fully charged Purple-K 20 B:C fire extinguishers readily accessible from the ground. One fire extinguisher shall be installed on each side of the vehicle. If the extinguishers are protected from the elements by covers, the extinguisher locations shall be clearly marked by labels consisting of two(2)-inch-high letters in contrasting colors.

**5D.17. Hydrant Pressure Control**

If the hydrant at the connecting point is not equipped with a pressure limiting valve, the refueling system shall be equipped with a pressure control coupler and it shall operate as the primary pressure control valve.

**5D.18. Hydrant Excess Flow Shutdown Control**

If the hydrant at the connecting point is not equipped with an excess flow shutdown, the vehicle shall be equipped with a coupler that is equipped with an excess flow shutdown. The excess flow control shall be set at a flow rate that is approximately 50 gpm higher than the flow rate setting of the vehicle.

**5D.19. System Check Valve**

The refueling system shall be equipped with a main system check valve that prevents any fuel from being pumped into the hydrant system.

**5D.20. Auxiliary Air System**

The auxiliary air system of vehicles equipped with air brakes shall fill with air from the vehicles compressed air system only when the vehicle's air brake system has an air pressure of 65 psi or higher.

**5D.21. Fuel Recovery Tank System**

All hydrant service vehicles shall be equipped with a fuel recovery tank to collect fuel from air eliminators, pressure relief systems, product vents, etc. The tank and system components shall be designed to operate in all system-vacuum- and working-pressure- operating conditions. The tank shall be equipped with an inspection cover which shall be either securely tightened or be lockable. The fuel recovery tank shall be equipped with one of the following systems:

- A.** Shutdown System: A system that disables the fueling system, including the deadman system whenever the fuel recovery tank is filled to a level of approximately  $\frac{3}{4}$  full or more.
- B.** Automatic Recirculation System: A system that automatically empties the fuel recovery tank whenever the tank is filled to a level of approximately  $\frac{3}{4}$  full and recirculates the product upstream of the filtration system. This system requires that all components meet all requirements specified in

paragraph entitled “Product Piping, Components, and Hose Coupling Materials.”

## **5D.22. Interlock System**

Hydrant service vehicles shall be equipped with a safety interlock system that automatically applies the vehicle’s parking or service brakes in a consistently controlled manner and allows the refueling system to be operational only when the interlock system is activated. The deadman system shall be designed so that the deadman is operational only when the refueling system is operational. The interlock system shall be equipped with an indicator light located on the dash to show that the interlock system is activated. The light is required to be operational only when the ignition switch is in the “on” position. The interlock system shall operate as follows:

- A.** The vehicle’s rear service brake lights shall illuminate (when vehicle’s ignition switch is in the “On” position), and the parking or service brakes shall automatically be applied and shall be prevented from release when any of the following conditions exist:
  - 1.** If equipped with air brakes, the air pressure for the vehicle’s brake system drops below 60 psi.
  - 2.** The hydrant coupler is removed from its storage holder.
  - 3.** Any nozzle is removed from its storage holder.
  - 4.** If equipped with a lift, the lift platform is raised from the full down position. In addition, the lift raising system shall not be operational unless the parking or service brakes are applied.
  - 5.** If equipped with folding platform handrails, the handrails are raised from the full down or locked position.

When the interlock system utilizes the vehicle’s parking brakes, the system shall be designed to operate in a manner that requires the operator to release the parking brakes from a control in the cab.

- B.** The refueling system shall be operational only when all of the following conditions exist:
  - 1.** The vehicle’s parking brakes are applied.
  - 2.** If the interlock system utilizes the vehicle’s service brakes, the service brakes are applied.
  - 3.** All emergency shut-off valves are in the deactivated position.

4. If the refueling system is equipped with a filter-separator, the water sump control valve is deactivated.
  5. If the vehicle is equipped with a recovery tank shutdown system, the fuel level in the recovery tank is  $\frac{3}{4}$  of the tank capacity or less.
- C. The vehicle's service brakes shall not be released and the vehicle's parking brakes shall not be capable of being released unless all of the following conditions exist:
1. If the vehicle is equipped with air brakes, the vehicle's brake system air pressure is above 60 psi
  2. All hydrant couplers are stored in their storage holders.
  3. All hose nozzles are stored in their storage holders.
  4. If equipped with a lift, the lift platform is fully lowered to the down position.
  5. If equipped with folding platform handrails, the handrails are lowered to the full down or locked position.
- D. The refueling system shall not be operational when any of the following conditions exist:
1. The vehicle's parking brakes are released.
  2. If the interlock system utilizes the vehicle's service brakes, the service brakes are released.
  3. Any emergency shut-off valve is activated.
  4. If the refueling system is equipped with a filter-separator, the water sump control valve is activated.
  5. If the vehicle is equipped with a recovery tank shutdown system, the fuel level in the recovery tank is more than  $\frac{3}{4}$  of the tank capacity.
- E. The vehicle's engine shall shut down and its starting circuit shall open so that the engine cannot be started when the conditions listed in A2 to A5 above exist, and only allow the engine to start and run when the conditions in C2 to C5 above exit. The conditions listed in A1 and C1 above shall not affect the starting or running of the engine.
- F. For emergency situations, the vehicle shall be equipped with an interlock override valve or switch located on the front left side of the vehicle, above

the bumper. The interlock override shall be safety wired in the deactivated position and be properly labeled “Interlock Override” with  $\frac{3}{4}$  inch letters. The interlock override shall disable the refueling system and allow the operator to override the interlock system. The interlock override system shall operate as follows:

1. Override the conditions listed in E above and allow the operator to start the vehicle.
2. Override the conditions listed in A2 to A4 above and release the vehicle’s service brakes or allow the operator to release the parking brakes from a control in the cab.
3. Deactivate the refueling system disabling the deadman.
4. The vehicle’s 4-way flashers operate when the interlock is activated.

- G. A Vehicle with air brakes shall be equipped with an air chuck installed on the control panel to allow filling its air reservoirs to release the vehicle’s brakes in the event that the vehicle’s air system is depleted. Brakes shall also be equipped for mechanical release using the method established by the cab-chassis manufacturer.

#### **5D.23. Material Prohibited**

Magnesium shall not be used on any refueling vehicle.

#### **5D.24. Storage Cabinets**

Storage cabinets shall have ventilated floors to prevent the accumulation of vapors and spilled liquids.

#### **5D.25. Paperwork Cabinets**

Paperwork cabinets may be waterproof type units used only to store paperwork.

#### **5D.26. Electric Powered Hydrant Service Vehicles**

Hydrant service vehicles equipped with an electric propulsion system shall be equipped with a properly ventilated propulsion compartment and a separate battery compartment. All driving motors, electrical controls, and electrical equipment for the propulsion system shall be located in the propulsion compartment and all electrical connections shall be protected with rubber boots or sealed with a non-conductive material. All driving motors, electrical controls,

and electrical equipment shall be installed at a minimum height of 18 inches above the ground. All driving motors, electrical controls, and electrical equipment shall be of a design suitable for Class I, Division 1, Group D locations as defined in Article 500 of the National Electrical Code (NEC), NFPA 70. The battery compartment of an electrically powered refueling hydrant service vehicle shall be fully insulated by a non-conductive lining and electrical leads shall be firmly fastened on insulated blocks to prevent short circuits. All other electrical systems shall meet all applicable NEC and NFPA 407 requirements.

## **5E. Type 4 Aircraft Refueling Tanker Vehicles**

All aircraft refueling tanker vehicles shall be in compliance with Federal, State, Local, and other appropriate regulatory bodies having jurisdiction in the area in which the Air Terminal is located. Specifically, all tanker vehicles shall be in compliance with Federal 49CFR Chapter V and 49CFR393, ATA Specification 103, SAE Aerospace Recommended Practice (ARP) 5818 latest revision, NFPA 385 and 407, and with any other applicable FAA requirements. All cargo tanks shall be designed, manufactured, tested, and certified that it is in compliance with all DOT 406 requirements. Compliance with the Federal and State requirements shall be limited to the extent that the units are to operate as typical aircraft refueling vehicles as typically used at other major Air Terminals and require meeting the specific requirements stipulated herein. The tanker vehicles shall meet all requirements listed in Chapter 5, entitled “Type 4 General Requirements for Air Operations Area Vehicles.” They shall also be in compliance with the requirements specified in this chapter section.

### **5E.1. Aircraft Refueling System Design**

The refueling system shall be equipped with a primary and secondary pressure limiting system and a flow limiting control system. The primary and secondary pressure control systems shall utilize a system bypass valve and an inline pressure control valve, one operating as the primary and the other as a secondary pressure control valve. The fueling control system shall be activated and deactivated by a deadman system. When the control system is activated fuel shall be pumped from the product tank through the control and filtration systems and then to the dispensing nozzle(s) in a fail-safe and controlled manner. The control system shall regulate and limit the fueling pressure at all nozzles and the dispensing flow rate at preset settings.

The pressure control system shall be controlled by regulating devices to sense fuel pressure at the nozzles. The control system shall limit the product pressure at any nozzle when fueling at any flow rate from zero to maximum flow and during any shutdowns. The system shall be designed so that any desired nozzle pressure limitation can be selected and maintained with a pressure accuracy at the nozzle as listed in the paragraph entitle “Aircraft Refueling System Operation and Performance.”

Vehicles equipped for overwing fueling are not required to be equipped with a deadman system. Overwing systems lacking a deadman system must include a meter that deactivates the system when a preset quantity of fuel is dispensed, and be equipped with a control system that limits the dispensing flow rate whenever any overwing nozzle is removed from its storage holder.

### **5E.2. Aircraft Refueling System Operation and Performance**

The refueling system shall not operate unless the primary pressure control system controls and limits the fueling pressure to a maximum limit of 40 psi and the secondary pressure control system controls and limits the fueling pressure to a maximum limit of 50 psi at the dispensing nozzle(s). The secondary system shall perform the controlling function if the primary control system becomes inoperative. The system shall perform the refueling function in a stable manner controlling the fueling pressure within  $\pm 2$  psi when fueling at any flow rate, and without excessive hunting. Systems that hunt to the point where the system recycles, stopping and starting with all manual valves in the full open positions shall not be used. The fuel control system shall also be designed so that the maximum momentary surge pressure in the fueling manifold of the aircraft (as measured directly downstream of the nozzle connections) does not exceed 120 psi when fueling at any flow conditions including at full rated flow and the fueling is stopped within 1 second, with any arrangement of nozzles used. To assure that the fueling system does not exceed a surge pressure limit, the system shall be periodically tested when fueling at a minimum of three different flow conditions, including fueling with a flow with a manifold back pressure of 0 PSI (providing rated flow rate), 25 PSI, and 40 PSI (or lower if the limited pressure setting is lower). The control system shall also limit the fueling system static pressure to a maximum lock-in pressure of 70 psi measured at the fueling underwing nozzle(s). The system and its accuracy shall be fully tested and properly documented on test sheets by the tow cart manufacturer, and operator when periodically testing.

Vehicles equipped with overwing fueling shall be equipped with a system that limits the dispensing flow rate to 40 gpm whenever any overwing nozzle is removed from its storage holder. In vehicles equipped with underwing and overwing systems, the overwing control system shall be designed to operate in a fail-safe manner that assures that when any component(s) failure(s) occur the system will not operate in underwing fueling conditions.

### **5E.3. Aircraft Authorized Fueling and Quality Control**

The tanker vehicles shall fuel only those aircraft that they are authorized to fuel. The authorized vehicles shall fuel at the limiting fueling pressure, flow, surge pressure, filtration requirements, etc. as required by the aircraft manufacturer and the airline, whichever requires more stricter requirements. The complete refueling system, including the control systems and fuel quality shall be checked, inspected, and tested in accordance with ATA Specification 103 and any additional requirements requested by the airlines. All Jet fuel dispensed shall conform to ASTM D-1655 latest revision and ATA Specification 103 requirements.



#### **5E.4. Testing and Certification**

Each tanker vehicle shall be fully tested by the manufacturer to assure that it is equipped with all components and systems to safely operate under all extreme conditions encountered in normal operation and to assure that the unit meets all other requirements of these specifications. All tests and safety features shall be properly tested and documented. Each tanker vehicle shall have a label or tag affixed to it certifying compliance with all applicable 49CFR requirements, SAE ARP 1247, AIR 1375, and ARP 5818 latest revisions, NFPA 385 and 407, ATA Specification 103, that are in effect at the date of manufacture. Cargo tanks shall be tested, certified, and labeled by the tank manufacturer that it is in full compliance with Federal DOT requirements. In addition, each vehicle shall be labeled by the final-stage manufacturer as required by 49CFR568.

#### **5E.5. Inspection and Maintenance**

All tanker vehicles shall be inspected, repaired, and maintained as required by 49CFR396. All of the vehicle's systems, parts, accessories, shall be properly inspected and maintained in safe and proper operating condition. Wear limits and replacement criteria for all systems and components shall be in accordance with the manufacturer's published recommendations.

The complete refueling system shall have daily and periodical checks, inspections, and tests performed in accordance with ATA Specification 103. All tanks shall be inspected, tested, and qualified in accordance with 49CFR180. All inspections, tests, and qualifications shall be properly documented.

#### **5E.6. Cab-Chassis**

All vehicles shall be equipped with a properly rated for the application and service requirements. The cab-chassis shall meet all FMVSS requirements and be certified in accordance with 49CFR568.

**5E.7. Engines**

The vehicle's propulsion engine shall be either a diesel or an alternatively fueled engine located in a self-contained engine compartment, independent of the cargo tank, and be covered so that any fuel leakage during aircraft fueling operation does not fall on any part of the engine. The engine compartment shall be fully ventilated and be accessible for fire suppression.

**5E.8. Exhaust System**

The vehicle's exhaust system shall be equipped with a muffler and spark arrestor. The vehicle's exhaust system shall be designed so that it directs and discharges exhaust down at the right side of the vehicle, a minimum horizontal distance of three (3) feet away from the product tank and fuel handling equipment. All exhaust system piping or components shall be a minimum of two (2) feet away from the product tank. The exhaust shall be protected from contact with accumulations or leaks of grease, oil, vehicle fuel, or the product carried in the product tank.

On tractors or cab-over-engine type units, minimal exhaust system piping and components shall extend behind the cab, and any piping or components that extend behind the cab shall be covered with a shield that diverts any product away from the exhaust. In addition, the exhaust muffler and spark arrestor shall be located forward of the rear of the cab and shall discharge at the front right side of the vehicle.

**5E.9. Vehicle Lights**

The cab of the vehicle may be equipped with the manufacturer's standard lights. The body of the tanker vehicles shall be equipped with vapor-proof type lights and sealed (vapor proof) wiring systems.

**5E.10. Product Filter-Separator and Filter Monitor**

The refueling system shall be equipped with either a filter-separator, monitor, or both, rated for a minimum of 5% higher than the refueling capacity of the vehicle. The filter-separator and monitor may be a single vessel with their elements combined in one unit. The filter-separator and/or monitor shall be installed so all fuel dispensed passes through the unit. The filter-separator and monitor shall meet all API, IP, or API/IP latest requirements. The filter-separator and/or monitor system shall be properly designed with necessary components to automatically and continuously eliminate any entrapment of air in any part of the system. In

addition, the filter-separator shall be equipped with a vacuum breaker and air purge valve for draining and properly filling the vessel.

The filtration system(s) elements shall be properly rated for the pressure and flow requirements that it may be exposed to with the possible failure of any system component(s).

#### **5E.11. Fuel Dispensing Nozzles**

All nozzles shall be equipped with holders and each holder shall be equipped with a sensing unit that senses when the nozzle is stored and operate with the interlock system function.

#### **5E.12. Fire Extinguishers**

All vehicles shall be equipped with two fully charged (2) Purple-K 20 B:C fire extinguishers readily accessible from the ground. One fire extinguisher shall be installed on each side of the vehicle. If the extinguishers are protected from the elements by covers, the extinguisher locations shall be clearly marked by labels consisting of two(2)-inch-high letters in contrasting colors.

#### **5E.13. Interlock System**

Tanker vehicles shall be equipped with a safety interlock system that automatically applies the vehicle's parking or service brakes in a consistently controlled manner and allows the refueling system to be operational only when the interlock system is activated.

The deadman system shall be designed so that the deadman is operational only when the refueling system is operational. The interlock system shall be equipped with an indicator light located on the dash to show that the interlock system is activated. The light is required to be operational only when the ignition switch is in the "on" position. The interlock system shall operate as follows:

- A. The vehicle's parking or service brakes shall be applied when any of the following conditions exist:
  - 1. Vehicles equipped with air brakes, the air pressure for the vehicle's brake system drops below 60 psi.
  - 2. The pump and/or Power Take Off are engaged.
  - 3. The bottom loading system is activated.
  - 4. Any internal valve is open.
  - 5. Any fuel-dispensing nozzle is removed from its storage holder.

6. Any lift platform is raised from the full down position and the lift raising system shall not be operational unless the parking or service brakes are applied.
7. If equipped with folding platform handrails, the handrails are raised from the full down or locked position

The system shall be designed so that when any of the above conditions exist, the operator cannot release the vehicle's parking or service brakes. The vehicle's rear service brake lights shall turn "on" when the ignition switch is in the "on" position and the vehicle's parking or service brakes are applied by any of the above conditions.

8. When the interlock system utilizes the vehicle's parking brakes, the system shall be designed to operate in a manner that requires the operator to release the parking brakes from a control in the cab.

**B.** The refueling system shall be operational only when all of the following conditions exist:

1. The vehicle's parking brakes are applied.
2. If the interlock system utilizes the vehicle's service brakes, the service brakes are applied.
3. The pump and/or Power Take Off are engaged.
4. The internal valve is open.
5. Any fuel-dispensing nozzle is removed from its storage holder.
6. All emergency-shut-off valves are in the deactivated position.
7. If the refueling system is equipped with a filter-separator, the water sump control valve is deactivated.

**C.** The vehicle's service brakes shall be released and the vehicle's parking brakes shall be capable of being released only when all of the following conditions exist:

1. In vehicles equipped with air brakes, the air pressure for the vehicle's brake system is above 60 psi.
2. The pump and/or Power Take Off are disengaged.
3. The bottom loading system is deactivated.
4. All internal valves are closed.
5. All hose nozzles are stored in their storage holders.

6. If equipped with a lift, the lift platform is fully lowered to the down position.
7. If equipped with folding platform handrails, the handrails are lowered to the full down or locked position.

Vehicles equipped with air brakes, or when possible, the system shall be designed to operate in a manner that requires the operator to release the parking brakes from a control in the cab.

- D.** The refueling system shall not be operational when any of the following conditions exist:
1. The vehicle's parking brakes are released.
  2. If the interlock system utilizes the vehicle's service brakes, the service brakes are released.
  3. The pump and/or Power Take Off is disengaged.
  4. The internal valve is closed.
  5. All fuel-dispensing nozzles are stored in their storage holders.
  6. Any emergency-shut-off valves are activated.
  7. If the refueling system is equipped with a filter-separator, the water sump control valve is activated.
- E.** For emergency situations the vehicle shall be equipped with an interlock override valve or switch located on the front left side of the vehicle, above the bumper. The interlock override shall disable the refueling system and allow the operator to override the interlock system. The interlock override shall be safety wired in the deactivated position and be properly labeled "Interlock Override" with  $\frac{3}{4}$  inch letters. The interlock override system shall operate as follows:
1. Override the conditions listed in A3 to A7 above and release the vehicle's service brakes or allow the operator to release the parking brakes from a control in the cab.
  2. Deactivate the refueling system disabling the deadman.
  3. The vehicle's 4-way flashers are operated when the interlock is activated.

Vehicles with air brakes shall be equipped with an air chuck installed on the control panel and/or front glad hands to release the vehicle's brakes to allow the filling of its air reservoirs in the event that the vehicle's air system is depleted.

The brakes shall be equipped with a mechanical release using the method established by the cab-chassis manufacturer.

#### **5E.14. Material Prohibited**

Magnesium shall not be used on any refueling vehicle.

#### **5E.15. Auxiliary Air System**

The auxiliary air system of vehicles equipped with air brakes shall fill with air from the vehicles compressed air system only when the vehicle's air brake system has an air pressure of 65 psi or higher.

#### **5E.16. Storage Cabinets**

Storage cabinets shall have ventilated floors to prevent accumulation of vapors and spilled liquids.

#### **5E.17. Paperwork Cabinets**

Paperwork cabinets may be waterproof type units used only to store paperwork.

#### **5E.18. Product Tanks**

All tanks shall be of either aluminum or 300-series stainless steel construction throughout, including all components, bolts, nuts, and washers. All tanks shall be designed to be in compliance with Federal DOT packaging, shipping, operating, and handling requirements for the product that it is approved to handle. All tank manhole openings shall be equipped with a sealed gauge marker set to indicate that the tank or compartment is full, and which indicates the maximum allowable fill capacity of the tank or compartment. The tank shall have a minimum space for expansion of the product that is equal to three percent (3%) of the tank's nominal capacity when the tank is filled to its full markers. The tank shall have a trough or pitch at the bottom to collect water. The trough or pitch at the bottom of the tank shall be a minimum of one-in-ten slope in the transverse direction leading to the bottom sump drain of either the complete tank or each compartment. The top of the tank shall be equipped with necessary flashing that directs any fuel away from spilling on the engine or transmission. All lines that drain the top of the tank shall be of clear tubing with a minimum size of 1½ inches that permit quick inspections if the lines are clogged and drain approximately 6 inches below the frame.

**5E.19. VAPOR RECOVERY SYSTEM**

All vehicles that transport and/or dispense any aviation gasoline products shall be equipped with a vapor recovery system as required by 49CFR requirements.

**5E.20. Product Piping, Components, and Hose Coupling Materials**

All product piping, components, and hose coupling materials shall be compatible with the fuel contained therein. All piping and components that retain, convey, or handle the dispensing of refueling including all components in the product tank shall be free of copper, brass, lead, and zinc. All dispensing piping shall be of either aluminum or 300-series stainless steel construction throughout, including all bolts, nuts, and washers that are in contact with the dispensing fuel. All other hose couplings downstream of the first filtration system, including Jac Risor hoses, shall be stainless steel and meet all requirements of API Standard 1529 latest revision for its application, except that dispensing hose couplings may be brass couplings meeting all requirements of API Standard 1529 latest revision. The filter-separator or filter-separator/monitor may be carbon steel and it shall be epoxy coated in compliance with all latest API requirements. The filter-monitor shall be aluminum or stainless steel and meet all latest IP requirements.

**5E.21. Trailers**

All trailer type units shall be equipped with brakes that will automatically apply upon breakaway from the tractor or towing vehicle and that will stop and hold the trailer.

When the semi-trailer is connected to the tractor, the fifth wheel release mechanism shall be secured with either a safety bolt, pin, or other securing device that prevents the mechanism from being released.

**5E.22. Bottom Loading**

All tanks equipped with bottom loading capability shall be equipped with a product loading shutdown system that shuts down the filling operation, closing the tank's internal valve(s), when the tank or compartment is filled to the full markers set for expansion space allowances. The shutdown system shall be equipped with a precheck system that allows testing the operation of the shutdown system during the filling operation. The precheck system may be operated either manually or automatically. All lines that operate the precheck system shall be filtered through a water absorbing filter elements.

The bottom loading system shall also be equipped with a backup shutdown system that also shuts down the loading rack in the event that the above shutdown system fails. The backup shutdown system shall be compatible to properly operate with the rack shutdown system at the respective Air Terminal. The backup shutdown system shall be equipped with a precheck system to test its operation before completing each bottom loading operation.

#### **5E.23. Tank, Piping, and Component Drains**

All tanks that handle the product on the vehicle and all piping shall be equipped with drains to permit complete drainage. Components that cannot be drained through the tank or piping shall also be equipped with drains. The tank sump drainage system shall be designed, assembled, and operate in accordance with 49CFR178.346. All tank sump drain valves shall be of a spring-loaded positive-shut-off type so that the valve will self-close and remain closed unless activated to hold the valve open. The main piping system shall be equipped with a sump and drain at the low point. All sump drain lines shall be of a rigid metallic material capable of handling the product. All drain lines shall extend to the side of the vehicle and be grouped together as practical in an accessible area, be protected with structural framework, and be properly labeled. The end of the sump drain lines shall be equipped with manually operated drain ball valve with downspouts that drain the product down with minimal splashing. The end of the spouts shall be equipped with quick connecting caps or plugs secured to the vehicle.

#### **5E.24. Hoses and Hose Certificates**

All hoses on the vehicle shall be in compliance with API Standard 1529 for its application and each hose shall have a certificate certifying compliance with all NFPA 407 requirements.

#### **5E.25. Battery Main Disconnect Switch and Critical Circuits**

All vehicles shall be equipped with a vapor proof battery main disconnect switch that completely disconnects battery power. This switch shall have its terminal connections enclosed so that they are protected from any product or fuel spills and located as close as possible to the battery. Critical circuits that are required by the vehicle or component manufacturer(s) to be powered directly off the battery, such as ECU's (Electronic Control Units), VIM's (Vehicle Interface Modules), etc., may be powered directly off the battery, but each circuit shall be protected by a properly rated fuse located as close as possible to the battery.



**5E.26. Electric Powered Vehicles**

Tanker vehicles equipped with an electric propulsion system shall be equipped with a properly ventilated propulsion compartment and a separate battery compartment. All driving motors, electrical controls, and electrical equipment for the propulsion system shall be located in the propulsion compartment and all electrical connections shall be protected either with rubber boots or sealed with a non-conductive material. All driving motors, electrical controls, and electrical equipment shall be installed at a minimum height of 18 inches above the ground. All driving motors, electrical controls, and electrical equipment shall be of a design suitable for Class I, Division 1, Group D locations as defined in Article 500 of the National Electrical Code (NEC), NFPA 70. The battery compartment of an electrically powered refueling tanker shall be fully insulated by a non-conductive lining and electrical leads shall be firmly fastened on insulated blocks to prevent short circuits. All other electrical systems shall meet all applicable NEC and NFPA 407 requirements.

## **5F. Type 4 Automotive Refueling Tanker Vehicles**

All automotive refueling tanker vehicles shall be in compliance with Federal, State, Local, and other appropriate regulatory bodies having jurisdiction in the area in which the Air Terminal is located. Specifically, all tanker vehicles shall be in compliance with Federal 49CFR Chapter V and 49CFR393, SAE Aerospace Recommended Practice (ARP) 1247 and applicable ARP 5818 latest revision, NFPA 385, and with any other applicable FAA requirements. All cargo tanks shall be designed, manufactured, tested, and certified that it is in compliance with all DOT 406 requirements. Compliance with the Federal and State requirements shall be limited to the extent that the units are to operate as typical automotive refueling vehicles as typically used at other major Air Terminals and require meeting the specific requirements stipulated herein. The tanker vehicles shall meet all requirements listed in Chapter 5, entitled “Type 4 General Requirements for Air Operations Area Vehicles,” and in addition they shall be in compliance with the requirements set forth in this sub chapter.

### **5F.1. Automotive Refueling System Design**

The refueling system shall be equipped with a fail-safe flow limiting control system. The fueling control system shall be operated (activated and deactivated) by an operator controlled system. When the control system is activated, fuel shall be pumped from the product tank through the control system, then to the filtration system, and then to the dispensing equipment in a fail-safe and controlled manner. The control system shall regulate and limit the dispensing flow rate at all nozzles at a preset setting.

All types of automotive refueling vehicles may have a refueling system equipped with a pumping system that is powered either by a Power Take Off system or an electrical motor. If an electric motor is used, the motor shall be of an explosion proof type and the complete electric system shall be in compliance with National Electric Code requirements for a system operating in hazardous conditions where gasoline is the product being handled.

**5F.2. Automotive Refueling System Operation and Performance**

The refueling system shall be set to operate so that the dispensing rate of flow is limited to a maximum allowable pumping rate of 12 gpm measured at any nozzle. The system shall operate in a fail-safe manner so that any single component failure shall either stop the system from operating or allow it to operate at a diminished rate of flow.

The system shall perform the refueling in a stable manner, controlling the fuel flow when fueling at any flow rate without hunting. The fuel control system shall also be designed so that upon release of the fueling nozzle the fuel flow shall fully stop instantly. The control system shall also limit the fueling system static pressure to a maximum lock-in pressure of 20 psi, achieved in any possible manner. The complete system and its accuracy shall be fully tested and properly documented on test sheets by the vehicle manufacturer.

**5F.3. Automotive Vehicles Authorized Fueling and Quality Control**

The automotive refuelers shall only fuel those vehicles and at the locations and times as authorized by the Air Terminal Manager. The fuel quality shall be checked, inspected, and tested in accordance with industry practices. Fuel dispensed should conform to ASTM, latest revision, specifications for the product being dispensed.

**5F.4. Testing and Certification**

Each tanker vehicle shall be fully tested by the manufacturer to assure that it is equipped with all components and systems to safely operate under all conditions and to assure that the unit meets all other requirements of these specifications. All tests and safety features shall be properly tested and documented. Each tanker vehicle shall have a label or tag affixed to it certifying compliance with all applicable 49CFR requirements, SAE ARP 1247 and applicable ARP 5818 and AIR 1375 latest revisions, NFPA 385, that are in effect at the date of manufacture. Cargo tanks shall be tested, certified, and labeled by the tank manufacturer that it is in full compliance with Federal DOT requirements. In addition, each vehicle shall be labeled by the final-stage manufacturer as required by 49CFR568.

### **5F.5. Inspection and Maintenance**

Tanker vehicles shall be inspected, repaired, and maintained as required by 49CFR396. All of the vehicle's systems, parts, accessories, shall be properly inspected and maintained in safe and proper operating condition. Wear limits and replacement criteria for all systems and components shall be in accordance with the manufacturer's published recommendations.

The complete refueling system shall have daily and periodical checks, inspections, and tests performed in accordance with the vehicle manufacturer's recommendations. All tanks shall be inspected, tested, and qualified in accordance with 49CFR180. All inspections, tests, and qualifications shall be properly documented.

### **5F.6. Cab-Chassis**

All vehicles shall be equipped with a cab-chassis manufacturer's standard production cab-chassis, properly rated for the application and service requirements. The cab-chassis shall meet all FMVSS requirements and be certified in accordance with 49CFR568.

### **5F.7. Engines**

The vehicle's propulsion engine shall be a diesel or alternatively fueled located in a self-contained engine compartment, independent of the cargo tank, and be covered with proper shields so that any fuel leakage during aircraft fueling operation does not fall on any part of the engine. The engine compartment shall be fully ventilated and be accessible for fire fighting.

### **5F.8. Exhaust System**

The vehicle's exhaust system shall be equipped with a muffler and spark arrestor. The vehicle's exhaust system shall be designed so that it directs and discharges exhaust downward at the right side of the vehicle, a minimum horizontal distance of three (3) feet away from the product tank and fuel handling equipment. All exhaust system piping or components shall be a minimum of two (2) feet away from the product tank. The exhaust shall be protected from exposure to accumulations or leaks of grease, oil, vehicle fuel, or the product carried in the product tank.

On tractors or cab-over-engine type units, minimal exhaust system piping and components shall extend behind the cab, and any piping or components that

extend behind the cab shall be covered with a shield that diverts any product away from the exhaust. In addition, the exhaust muffler and spark arrestor shall be located forward of the rear of the cab and shall discharge at the front right side of the vehicle.

#### **5F.9. Vehicle Lights**

The cab of the vehicle may be equipped with the manufacturer's standard lights. The body of the tanker vehicles shall be equipped with vapor-proof type lights and sealed (vaporproof) wiring systems.

#### **5F.10. Product Filtration**

If the vehicle is equipped with a filtration system, the filtration system shall be properly rated for the refueling system flow capacity. The system shall be properly designed to eliminate any entrapment of air in any part of the system.

#### **5F.11. Emergency Shutoff Valves**

The tanker vehicle shall be equipped with two emergency shutoff valves, located on each side of the vehicle, that shut down the refueling system when activated. The valves shall be labeled "EMERGENCY SHUTOFF" with 1½-inch letters.

#### **5F.12. Fuel Dispensing Nozzles**

All fuel dispensing nozzles shall be equipped with nozzle holders and each holder shall be equipped with a sensing unit that senses when the nozzle is stored and operates with the interlock system function.

#### **5F.13. Fire extinguishers**

All vehicles shall be equipped with two(2) fully charged Purple-K 20 B:C fire extinguishers readily accessible from the ground. One fire extinguisher shall be installed on each side of the vehicle. If the extinguishers are protected from the elements by covers, the extinguisher locations shall be clearly marked by labels consisting of two(2)-inch-high letters in contrasting colors.

#### 5F.14. Interlock System

Tanker vehicles shall be equipped with a safety interlock system that automatically applies the vehicle's parking or service brakes in a consistently controlled manner and allows the refueling system to be operational only when the interlock system is activated. The interlock system shall be equipped with an indicator light located on the dash to show that the interlock system is activated. The light is required to be operational only when the ignition switch is in the "on" position. The interlock system shall operate as follows:

**A.** The vehicle's parking or service brakes shall be applied and shall be prevented from release when any of the following conditions exist:

1. Vehicles equipped with air brakes, the air pressure for the vehicle's brake system drops below 60 psi.
2. The pump and/or PTO are engaged.
3. The bottom loading system is activated.
4. Any internal valve is open.
5. Any fuel-dispensing nozzle is removed from its storage holder.

The vehicle's rear service brake lights shall turn "on" when the ignition switch is in the "on" position and the vehicle's parking or service brakes are applied by any of the above conditions.

When the interlock system utilizes the vehicle's parking brakes, or when possible, the system shall be designed to operate in a manner that requires the operator to release the parking brakes from a control in the cab.

**B.** The refueling system shall be operational only when all of the following conditions exist:

1. The vehicle's parking brakes are applied.
2. If the interlock system utilizes the vehicle's service brakes, the service brakes are applied.
3. The pump and/or PTO are engaged.
4. Any internal valve is open.
5. Any fuel-dispensing nozzle is removed from its storage holder.
6. All emergency shutoff valves are in the deactivated position.

- C.** The vehicle's service brakes shall not be released and the vehicle's parking brakes shall not be capable of being released unless all of the following conditions exist:

1. Vehicles equipped with air brakes, the air pressure for the vehicle's brake system is above 60 psi.
2. The pump and/or PTO are disengaged.
3. The bottom loading system is deactivated.
4. All internal valves are closed.
5. All hose nozzles are stored in their storage holders.

Vehicles equipped with air brakes, or when possible, the system shall be designed to operate in a manner that requires the operator to release the parking brakes from a control in the cab.

- D.** The refueling system shall not be operational when any of the following conditions exist:

1. The vehicle's parking brakes are released.
2. If the interlock system utilizes the vehicle's service brakes, the service brakes are released.
3. The pump and/or PTO are disengaged.
4. All internal valves are closed.
5. All fuel-dispensing nozzles are stored in their storage holders.
6. Any emergency shutoff valves are activated.

- E.** For emergency situations, the vehicle shall be equipped with an interlock override valve or switch located on the front left side of the vehicle, above the bumper. The interlock override shall disable the refueling system and allow the operator to override the interlock system. The interlock override shall be safety wired in the deactivated position and be properly labeled "Interlock Override" with 3/4-inch letters. The interlock override system shall operate as follows:

1. Override the conditions listed in A3 to A5 above and release the vehicle's service brakes or allow the operator to release the parking brakes from a control in the cab.
2. Deactivate the refueling system.
3. The vehicle's 4-way flashers are operated when the interlock is activated.

- F.** Vehicles with air brakes shall be equipped with an air chuck installed on the control panel to allow filling its air reservoirs in the event that the vehicle's air system is depleted to release the vehicle's brakes. The brakes shall also be equipped with a mechanical release using the method established by the cab-chassis manufacturer.

#### **5F.15. Material Prohibited**

Magnesium shall not be used on any refueling vehicle.

#### **5F.16. Auxiliary Air System**

The auxiliary air system of vehicles equipped with air brakes shall fill with air from the vehicles compressed air system only when the vehicle's air brake system has an air pressure of 65 psi or higher.

#### **5F.17. Storage Cabinets**

Storage cabinets shall have ventilated floors to prevent accumulation of vapors and spilled liquids.

#### **5F.18. Paperwork Cabinets**

Paperwork cabinets may be waterproof type units used only to store paperwork.

#### **5F.19. Product Tanks**

All tanks shall be of either aluminum or 300-series stainless steel construction throughout, including all components, bolts, nuts, and washers. Automotive fuel dispensing vehicles handling gasoline shall have a maximum nominal capacity of 3,000 gallons. All tanks shall be designed to be in compliance with Federal DOT packaging, shipping, operating, and handling requirements for the product that it is approved to handle. All tank manhole openings shall be equipped with a sealed gauge marker set to indicate that the tank or compartment is full, and indicates the maximum allowable fill capacity of the tank or compartment. The tank shall have a minimum space for expansion of the product that is equal to five (5) percent of the tank's capacity when the tank is filled to its full markers. The tank shall be of an adequate design to properly operate as an automotive refueling vehicle, and should have a sump area to collect water. The top of the tank shall be equipped with necessary flashing that directs any fuel away from spilling on the engine or transmission. All lines that drain the top of the tank shall be of clear tubing that



permit quick inspections if the lines are clogged and drain approximately 6 inches below the frame.

#### **5F.20. Product Piping, Components, and Hose Coupling Materials**

All hoses, piping, and component materials shall be compatible with the product dispensed. All hoses shall be equipped with proper hose couplings and each hose-coupling assembly shall be tested.

#### **5F.21. Trailers**

All trailer type units shall be equipped with brakes that will automatically apply upon breakaway from the tractor or towing vehicle and that will stop and hold the trailer.

When the semi-trailer is connected to the tractor, the fifth wheel release mechanism shall be secured with either a safety bolt, safety wire, or chain to prevent the system from being released.

Full trailer type tankers shall not be used for automotive refuelers.

#### **5F.22. Bottom Loading**

All tanks equipped with bottom loading capability shall be equipped with a product loading shutdown system that shuts down the filling operation, closing the tanks internal valve(s), when the tank or compartment is filled to the full marker set for expansion space allowances. The shutdown system shall be equipped with a precheck system that allows testing the operation of the shutdown system during the filling operation. The precheck system may be operated either manually or automatically. All lines that operate the precheck system shall be filtered through a water absorbing filter elements.

The bottom loading system shall also be equipped with a backup shutdown system that also shuts down the loading rack in the event that the above shutdown system fails or have a second operator near the rack that can immediately shutdown the rack when the tank is filled to the markers. If equipped with a backup shutdown system, the backup shutdown system shall be compatible to properly operate with the rack shutdown system at the respective loading rack. In addition, the backup shutdown system shall be equipped with a precheck system to test it's operation before completing each bottom loading operation.

**5F.23. Tank, Piping, and Component Drains**

The tank and all piping shall be equipped with drains to permit complete drainage. Components that cannot be drained through the tank or piping shall also be equipped with drains. The tank sump drainage system shall be designed, assembled, and operate in accordance with 49CFR178.346. All tank sump drain valves shall be of a spring-loaded positive-shut-off type so that the valve will self-close and remain closed unless activated to hold the valve open. All drain lines shall be of a rigid metallic material capable of handling the product. All drain lines shall extend to the side of the vehicle in an accessible area, be protected with structural framework, and be properly labeled. The end of the sump drain lines shall be equipped with manually operated drain ball valve with downspouts that drain the product down with minimal splashing. The end of the spout shall be equipped with quick connecting caps or plugs secured to the vehicle.

**5F.24. Battery Main Disconnect Switch and Critical Circuits**

All vehicles shall be equipped with a vapor proof battery main disconnect switch that completely disconnects battery power. This switch shall be located as close as possible to the battery. Critical circuits that are required by the vehicle or component manufacturer(s) to be powered directly off the battery, such as ECU's (Electronic Control Units), VIM's (Vehicle Interface Modules), etc., may be powered directly off the battery, but each circuit shall be protected by a properly rated fuse located as close as possible to the battery.

**5F.25. Electric Powered Vehicles**

Tanker vehicles equipped with an electric propulsion system shall be equipped with a properly ventilated propulsion compartment and a separate battery compartment. All driving motors, electrical controls, and electrical equipment for the propulsion system shall be located in the propulsion compartment and all electrical connections shall be protected either with rubber boots or sealed with a non-conductive material. All driving motors, electrical controls, and electrical equipment shall be installed at a minimum height of 18 inches above the ground. All driving motors, electrical controls, and electrical equipment shall be of a design suitable for Class I, Division 1, Group D locations as defined in Article 500 of the National Electrical Code (NEC), NFPA 70. The battery compartment of an electrically powered refueling tanker shall be fully insulated by a non-conductive lining and electrical leads shall be firmly fastened on insulated blocks to prevent short circuits. All other electrical systems shall meet all applicable NEC and NFPA 407 requirements.

**5G. Type 4 Hazmat Tank Vehicle  
All Other Types of Vehicles  
Transporting or Dispensing Other Fuels  
Or Any Hazardous Material Products**

All vehicles transporting or dispensing any other types of fuels not covered by the other chapter sections in this chapter shall be in compliance with Federal, State, Local, and other appropriate regulatory bodies having jurisdiction in the area in which the Air Terminal is located. Specifically, all vehicles shall be in compliance with Federal 49CFR Chapter V, 49CFR393, and 49CFR 171 specific requirements, SAE Aerospace Recommended Practice (ARP) 1247 and other applicable SAE documents latest revisions, NFPA 385, and with any other applicable FAA requirements. All cargo tanks shall be designed, manufactured, tested, and certified that it is in compliance with all DOT applicable requirements. Compliance with the Federal and State requirements shall be limited to the extent that the units are to operate as typical vehicles as used at major Air Terminals. The vehicles shall meet all requirements listed in Chapter 5, entitled “Type 4 General Requirements for Air Operations Area Vehicles,” and in addition they shall be in compliance with the requirements specified in this chapter section.

**5G.1. System Design**

All systems shall be equipped with a fail-safe flow limiting control system. The control system shall be operated (activated and deactivated) by an operator controlled system. When the control system is activated, the product shall be pumped from the product tank through the control system to any other system required for the product, and then to the dispensing equipment in a fail-safe and controlled manner. The control system shall regulate and limit the dispensing flow rate at all nozzles at a preset setting.

Vehicles may be equipped with a pumping system that is powered either by PTO system or an electrical motor. If an electric motor is used, if the product is classified as either flammable or combustible, the motor shall be of an explosion proof type and the complete electric system shall be in compliance with NEC and other applicable NFPA requirements for a system operating in hazardous conditions for the product being handled.

**5G.2. System Operation and Performance**

The system shall be set to operate so that the dispensing rate of flow is limited to a maximum allowable pumping rate as designed by the vehicle manufacturer and perform as similar types of vehicles in the industry that perform the same type of

operation. The system shall operate in a fail-safe manner so that any single component failure shall either stop the system from operating or allow it to operate at a diminished rate of flow.

The system shall operate in a stable manner controlling the flow when operating at any flow rate without hunting. The control system shall also be designed so that upon release of either a nozzle or deadman operator, the product flow shall fully stop instantly. The control system shall also limit the product system static pressure to a safe maximum lock-in pressure, achieved in any possible manner. The complete system and its accuracy shall be fully tested and properly documented on test sheets by the vehicle manufacturer.

### **5G.3. Testing and Certification**

All vehicles shall be initially fully tested by the manufacturer to assure that it is equipped with all proper and necessary components and systems to safely operate under all conditions. All safety features shall be properly tested and documented. Each vehicle shall have a label or tag affixed to it certifying compliance with applicable 49CFR requirements, all SAE applicable requirements, NFPA 385, or other applicable requirement that are in effect at the date of manufacture. Cargo tanks shall be tested, certified, and labeled by its manufacture that they are in full compliance with Federal DOT requirements. in addition, each vehicle shall be labeled by the final-stage manufacturer as required by 49CFR568.

### **5G.4. Inspection and Maintenance**

All vehicles shall be inspected, repaired, and maintained as required by 49CFR396. All of the vehicle's systems, parts, accessories, shall be properly inspected and maintained in safe and proper operating condition. Wear limits and replacement criteria for all systems and components shall be in accordance with the manufacturer's published recommendations.

The complete system shall have daily and periodical checks, inspections, and tests performed in accordance with the vehicle manufacturer's recommendations. All tanks shall be inspected, tested, and qualified in accordance with 49CFR180. All inspections, tests, and qualifications shall be properly documented.

**5G.5. Cab-Chassis**

All vehicles shall be equipped with a cab-chassis properly rated for the application and service requirements. The cab-chassis shall meet all FMVSS requirements and be certified in accordance with 49CFR568.

**5G.6. Engines**

The vehicle's propulsion engine of all vehicles handling flammable or combustible products shall be diesel or alternatively fueled located in a self-contained engine compartment, independent of the cargo tank, and be covered with so that any product leakage during loading or dispensing operation does not fall on any part of the engine. The engine compartment shall be fully ventilated and be accessible for fire fighting.

**5G.7. Exhaust System**

All vehicles handling flammable or combustible products shall be equipped with a muffler and spark arrestor. These vehicle's exhaust system shall be designed so that it directs and discharges exhaust down at the right side of the vehicle, a minimum horizontal distance of three (3) feet away from the product tank and product handling equipment. All exhaust system piping or components shall be a minimum of two (2) feet away from the product tank. The exhaust shall not be exposed to accumulations or leaks of grease, oil, vehicle fuel, or the product carried in the product tank.

On tractors or cab-over-engine type units for vehicles handling flammable or combustible products, minimal exhaust system piping and components shall extend behind the cab, and any piping or components that extend behind the cab shall be covered with a shield that diverts any product away from the exhaust. In addition, the exhaust muffler and spark arrestor shall be located forward of the rear of the cab and shall discharge at the right side of the vehicle.

**5G.8. Emergency Shutoff Valves**

The vehicle shall be equipped with two emergency shutoff valves, located on each side of the vehicle, that shut down the system when activated. The valves shall be labeled "EMERGENCY SHUTOFF" with 1½-inch letters.

### **5G.9. Hose Dispensing Nozzles**

All hose dispensing nozzles shall be equipped with nozzle holders and each holder shall be equipped with a sensing unit that senses when the nozzle is stored and operates with the interlock system function.

### **5G.10. Fire extinguishers**

All vehicles shall be equipped with two (2) Purple-K 20 B:C fire extinguishers readily accessible from the ground. One fire extinguisher shall be installed on each side of the vehicle. If the extinguishers are protected by covers, the extinguisher locations shall be clearly marked by labels consisting of two(2)-inch-high letters in contrasting colors.

### **5G.11. Interlock System**

The tanker vehicles shall be equipped with a safety interlock system that automatically applies the vehicle's parking or service brakes in a consistently controlled manner and allows the operating system to be operational only when the interlock system is activated. The interlock system shall be equipped with an indicator light located on the dash to show that the interlock system is activated. The light is required to be operational only when the ignition switch is in the "on" position. The interlock system shall operate as follows:

- A. The vehicle's parking or service brakes shall be applied and be prevented from release when any of the following conditions exist:
  - 1. Vehicles equipped with air brakes, the air pressure for the vehicle's brake system drops below 60 psi.
  - 2. The pump and/or PTO are engaged.
  - 3. The bottom loading system is activated.
  - 4. Any internal valve is open.
  - 5. Any dispensing nozzle is removed from its storage holder.

The vehicle's rear service brake lights shall turn "on" when the ignition switch is in the "on" position and the vehicle's parking or service brakes are applied by any of the above conditions.

When the interlock system utilizes the vehicle's parking brakes, or when possible, the system shall be designed to operate in a manner that requires the operator to release the parking brakes from a control in the cab.

- B.** The operating system shall be operational only when all of the following conditions exist:
1. The vehicle's parking brakes are applied.
  2. If the interlock system utilizes the vehicle's service brakes, the service brakes shall be applied.
  3. The pump and/or Power Take Off are engaged.
  4. The internal valve is open.
  5. Any dispensing nozzle is removed from its storage holder.
  6. All emergency-shutoff valves are in the deactivated position.
- C.** The vehicle's service brakes shall not be released and the vehicle's parking brakes shall not be capable of being released unless all of the following conditions exist:
1. Vehicles equipped with air brakes, the air pressure for the vehicle's brake system is above 60 psi.
  2. The pump and/or Power Take Off are disengaged.
  3. The bottom loading system is deactivated.
  4. All internal valves are closed.
  5. All hose nozzles are stored in their storage holders.
- In vehicles equipped with air brakes, the system shall be designed to operate in a manner that requires the operator to release the parking brakes from a control in the cab.
- D.** Unless the vehicle is handling flammable or combustible products or designed to operate while dispensing, the system shall not be operational when any of the following conditions exist:
1. The vehicle's parking brakes are released.
  2. If the interlock system utilizes the vehicle's service brakes, the service brakes are released.
  3. The pump and/or PTO are disengaged.
  4. The internal valve is closed.
  5. All dispensing nozzles are stored in their storage holders.
  6. Any emergency shutoff valves is activated.

- E.** For emergency situations, the vehicle shall be equipped with an interlock override valve or switch located on the front left side of the vehicle, above the bumper. The interlock override shall disable the system and allow the operator to override the interlock system. The interlock override system shall operate as follows:
- 1.** Override the conditions listed in A.3. to A.5. above and release the vehicle's service brakes or allow the operator to release the parking brakes from a control in the cab.
  - 2.** Deactivate the system.
  - 3.** The vehicle's 4-way flashers are operated when the interlock is activated.

The interlock override shall be safety wired in the deactivated position and be properly labeled "Interlock Override" with ¾-inch letters.

- F.** Vehicles with air brakes shall be equipped with an air chuck installed on the control panel to allow filling its air reservoirs to release the vehicles brakes in the event that the vehicle's air system is depleted. The brakes shall be equipped with mechanical released using the method established by the cab-chassis manufacturer.

#### **5G.12. Material Prohibited**

Magnesium shall not be used on any vehicle.

#### **5G.13. Auxiliary Air System**

The auxiliary air system of vehicles equipped with air brakes shall only fill with air from the vehicles compressed air system when the vehicle's air brake system has an air pressure of 65 psi or higher.

#### **5G.14. Storage Cabinets**

Storage cabinets shall have ventilated floors to prevent accumulation of vapors and spilled liquids.



**5G.15. Electric Powered Vehicles**

Vehicles equipped with an electric propulsion system shall be equipped with a properly ventilated propulsion compartment and a separate battery compartment. All driving motors, electrical controls, and electrical equipment for the propulsion system shall be located in the propulsion compartment and all electrical connections shall be protected either with rubber boots or sealed with a non-conductive material. All driving motors, electrical controls, and electrical equipment shall be installed at a minimum height of 18 inches above the ground. All driving motors, electrical controls, and electrical equipment shall be of a design suitable for the Class, Division, and Group location applicable for the product as defined in Article 500 of the National Electrical Code (NEC), NFPA 70. The battery compartment of an electrically powered vehicle shall be fully insulated by a non-conductive lining and electrical leads shall be firmly fastened on insulated blocks to prevent short circuits. All other electrical systems shall meet all applicable NEC and NFPA requirements.

**5G.16. Product Tanks**

All tanks shall be of proper construction throughout, including all components, bolts, nuts, and washers. All tanks shall be designed to be in compliance with Federal DOT packaging, shipping, operating, and handling requirements for the product that it is approved to handle. All tank manhole openings shall be equipped with a sealed gauge marker set to indicate that the tank is full, and indicates the maximum allowable fill capacity of the tank. The tank shall have a minimum space for expansion of the product that is equal to five percent (5%) of the tank's capacity when the tank is filled to its full markers. The tank shall be of an adequate design to properly handle the product. The top of the tank shall be equipped with necessary flashing that prevents any product from spilling on the engine or transmission. All lines that drain the top of the tank shall be of clear tubing that permit quick inspections if the lines are clogged, and shall drain approximately 6 inches below the frame.

**5G.17. Trailers**

All trailer type units shall be equipped with brakes that will automatically apply upon breakaway from the tractor or towing vehicle, and that will stop and hold the trailer.

When the semi-trailer is connected to the tractor, the fifth wheel release mechanism shall be secured with either a safety bolt, safety wire, or chain to prevent the system from being released.

Full trailer type tankers shall not be used to transport any hazardous material or products.

#### **5G.18. Bottom Loading**

All tanks equipped with bottom loading capability shall be equipped with a product loading shutdown system that shuts down the filling operation, closing the tanks internal valve(s), when the tank or compartment is filled to the full marker set for expansion space allowances. The shutdown system shall be equipped with a precheck system that allows testing the operation of the shutdown system during the filling operation. The precheck system may be operated either manually or automatically. All lines that operate the precheck system shall be protected so that it extreme weather conditions do not effect its operation.

#### **5G.19. Tank, Piping, and Component Drains**

The tank and all piping shall be equipped with drains to permit complete drainage. Components that cannot be drained through the tank or piping shall also be equipped with drains. The tank sump drainage system shall be designed, assembled, and operate in accordance with 49CFR applicable requirements.

#### **5G.20. Battery Main Disconnect Switch and Critical Circuits**

All vehicles shall be equipped with a vapor proof battery main disconnect switch that completely disconnects battery power. This switch shall be located as close as possible to the battery. Critical circuits that are required by the vehicle or component manufacturer(s) to be powered directly off the battery, such as ECU's (Electronic Control Units), VIM's (Vehicle Interface Modules), etc., may be powered directly off the battery, but each circuit shall be protected by a properly rated fuse located as close as possible to the battery.

## **5H. Type 4 Air Operations Area Ground Support Motorized and Non-Motorized Vehicles**

All motorized and non-motorized ground support vehicles shall be in compliance with SAE Aerospace Recommended Practice (ARP) 1247, AIR 1375, and ARP 1330 latest revisions, OSHA requirements, applicable FMVSS as much as practical, and any applicable FAA requirements. Motorized and non-motorized ground support vehicles that operate on the public roads shall also be in compliance with Federal, State, Local, and other appropriate regulatory bodies having jurisdiction in the area in which the Air Terminal is located. Compliance with the Federal and State requirements shall be limited to the extent that the units are to operate as typical ground support vehicles. The all motorized and non-motorized ground support vehicles shall meet all requirements listed in Chapter 5, entitled “Type 4 General Requirements for Air Operations Area Vehicles,” and in addition they shall be in compliance with the requirements specified in this chapter section.

### **5H.1. Testing and Certifying Operation**

All safety features shall be properly tested and results documented.

### **5H.2. Operations and Maintenance**

All ground service vehicles shall be periodically inspected and maintained in accordance with the manufacturer’s recommendations.

### **5H.3. Trailer Couplers**

All trailer-coupling devices connecting trailers to tractors shall be positive locking couplers. All couplers shall require manual action to be released.

### **5H.4. Parking Brake**

All ground service vehicles shall have a positive locking parking brake designed to prevent the unit from rolling on sloping ground or from being blown by the wind or aircraft jet blast. The parking brake shall be capable of holding the unit stationary on a 15% grade.

**5H.5. Lights**

All motorized ground service vehicles, and all motorized and non-motorized ground service equipment that handle any hazardous materials, shall be equipped with lights that are in compliance with FMVSS No. 108. All non-motorized equipment with a GVWR of 3,000 pounds or less and not handling any hazardous materials are not required to be equipped with lights.

**5H.6. Reflective Stripping**

All non-motorized equipment shall be equipped with retroreflective stripping that marks the corner extremities of the equipment from all directions (front, sides, and rear). The retroreflective stripping shall conform to the requirements of ASTM D4956 latest revision, Standard Specification for Retroreflective Sheeting for Traffic Control.

**5H.7. Rear Reflective Striping**

All non-motorized equipment that are not required to be equipped with lights and are not required to be escorted by lighted vehicles, and which have an overall height of 30 inches or more as measured from the ground, shall have the rear of the unit equipped with a pattern of alternating red and silver (or white) retroreflective striping in the shape of a "V." The striping shall cover as much as practical of the rear of the unit's continuous surface(s) and the "V" shall be sized accordingly. Small units shall have the "V" sized so that the top center of the "V" is a minimum of one(1)-foot wide and the overall height of the "V" is a minimum of two(2)-feet high. Variations on this pattern are permitted based on practicality but any variation must provide adequate reflective striping to identify the vehicle during the nighttime hours.

## **5I. Type 4 Air Operations Area Alternative Fueled Vehicles**

All alternatively fueled vehicles shall be in full compliance with all Federal, City and State regulations where they are operated in and with the appropriate NFPA standards. Specifically, alternatively fueled vehicles are those that are not fueled by gasoline or diesel fuel, but fueled by an alternate type of fuel including liquefied petroleum (LPG), liquefied natural gas (LNG), compressed natural gas (CNG), electric, hybrid, or bi-fueled. Bi-fuel vehicles or equipment are those that operate with two types of fuel and one of the fuels is one of the above listed alternative fuels. All alternatively fueled vehicles may only be operated with the authorization and with the guidelines and constraints issued by the Air Terminal Manager. All vehicles shall comply with the design, manufacture, operation, and maintenance requirements as established in this document for the designated type of vehicle or equipment. The vehicles shall meet all requirements listed in Chapter 5, entitled “Type 4 General Requirements for Air Operations Area Vehicles,” and in addition they shall be in compliance with the requirements specified in this chapter section.

### **5I.1. Liquefied Natural Gas (LNG) Vehicles**

All LNG vehicle shall comply with NFPA 57.

### **5I.2. Compressed Natural Gas (CNG) Vehicles**

All CNG vehicles shall comply with NFPA 52.

### **5I.3. Liquefied Petroleum Gas (LPG) Vehicles**

All LPG vehicles shall comply with NFPA 58.

### **5I.4. Electric Vehicles**

All electric vehicles shall comply with applicable sections of the National Electrical Code (NEC), NFPA 70.

**5I.5. Fuel Cylinders and Containers**

Cylinders and containers shall comply with the latest release of the appropriate chapters of NFPA Standards for the type of fuel. Cylinders and containers shall be tested in accordance with those standards to determine that they are safe and suitable for the proposed service. Records of initial acceptance tests and recurrent tests must be submitted and maintained by facility management (Operator, contractor, or company).

**5I.6. Vehicle Fueling and Repairs**

All alternatively fueled vehicles shall be refueled at an approved refueling station. All LPG vehicles shall have removable tanks and replaced in an approved properly ventilated location in accordance with NFPA standards. Liquid transfer of liquefied fuels shall comply with the appropriate chapters of NFPA Standards.

**5I.7. Signs and Placards**

The vehicle or equipment shall have signs properly posted on the unit with 4-inch high letters indicating the type of fuel. Vehicles or equipment including systems used for refrigeration or for the warming of foods shall comply with the appropriate chapters of NFPA Standards and shall have clear markings indicating the type of fuel that it operates with.

## **6. Type 5 Off-Highway, Construction, & Materials Handling Vehicles Used in Non AOA and in AOA Operating With State Plates, PA Plates, or No Plates**

Type 5 off-highway vehicles shall be in compliance with applicable FMVSS, OSHA requirements, all applicable SAE standards and recommended practices for the type of vehicle or equipment, and any applicable FAA requirements. All type 5 off-highway vehicles that operate on the public roads shall also be in compliance with Federal, State, Local, and other appropriate regulatory bodies having jurisdiction in the area in which the Air Terminal is located. Compliance with the Federal and State requirements shall be limited to the extent that the vehicles operate as typical off-highway vehicles. In addition to compliance with the above, all off-highway vehicles shall also meet the specific requirements stipulated herein.

### **6.1. Testing and Certifying Operation**

All safety features shall be properly tested and results documented.

### **6.2. Operations and Maintenance**

All type 5 off-highway vehicles shall be periodically inspected and maintained in accordance with the manufacturer's recommendations.

### **6.3. Permits, Certifications, or Authorizations**

At locations where City, State, or local jurisdictions require specific type 5 vehicles to have permits, certifications, or other authorizations to operate the vehicle, the vehicle shall only be used only after obtaining written permission from the Air Terminal Manager.

### **6.4. Temporary Use of Vehicles**

Vehicles not routinely used in AOA, but temporarily operated during construction, may be exempted from certain requirements by the Air Terminal Manager.

## **7. Type 6 Stationary Equipment Used in Public and Controlled Areas Operate With No Plates**

All type 6 stationary equipment shall be in compliance with Federal, State, Local, and other appropriate regulatory bodies having jurisdiction in the area in which the Air Terminal is located. Specifically, all type 6 stationary equipment shall be in compliance with applicable Federal EPA, OSHA, and NFPA latest revision, and with any other applicable FAA requirements.

### **7.1. Emergency and Standby Power System Design, Operation, Performance, and Maintenance**

All power systems that provide an alternate source of electrical power shall be designed to be in full compliance with NFPA 110 and all local applicable codes, laws, ordinances, rules, and regulations. Each system shall be properly classified for its intended service and its use shall be approved by the Air Terminal Manager. Each system shall operate and have performance requirements as required by NFPA 110. Each unit shall be properly, inspected, maintained and tested in accordance with NFPA 110 and the manufacturer's recommendations.

### **7.2. Centrifugal Fire Pump System Design, Operation, Performance, and Maintenance**

All pump systems that provide a water source for fire protection systems shall be designed to be in full compliance with NFPA 20 and all local applicable codes, laws, ordinances, rules, and regulations. Each system shall be properly classified for its intended service and its use shall be approved by the Air Terminal Manager. Each system shall operate and have performance requirements as required by NFPA 20. Each unit shall be properly, inspected, maintained and tested in accordance with NFPA 25 and the manufacturer's recommendations.

### **7.3. Testing and Certification**

Each system shall be initially fully tested by the manufacturer to assure that it is equipped with all components and systems to safely operate under all extreme conditions encountered in normal operation and to assure that the unit meets all other requirements of the appropriate regulations. All tests and safety features shall be properly tested and documented. Each unit shall have a label or tag affixed to it certifying compliance with all applicable requirements that are in effect at the date the unit is placed in service.



**7.4. Inspection and Maintenance**

Each unit shall be inspected, repaired, and maintained as required by the appropriate regulation and in accordance with the manufacturer's published recommendations.

Each complete system shall have daily and/or periodical checks, inspections, and tests performed in accordance with the respective requirements and all tests shall be properly documented.

**7.5. Exhaust System**

Each unit shall be equipped with the proper exhaust system with a critical silencer that reduces the noise to level that assures compliance with all state and local codes, and that directs and discharges the exhaust towards safe direction, away from patrons, buildings, etc.

**7.6. Emergency Standby and Activation Lights**

Each unit shall be equipped with a green standby light and a red activated light, installed in a location readily visible outside its regularly used access door. The green standby light shall indicate that the unit is ready for operation. The red activated light shall indicate that the unit is operating.

**7.7. Noise Level**

Each unit shall conform to Federal, State, and local noise level codes. Each unit shall be equipped with the necessary silencer and enclosure so that its noise level does not exceed 85dB(A) at a distance of 3 feet in a free field environment, as measured outside its regularly used access door, when operating at its rated output.