APTA STANDARDS PROGRAM

STANDARD

APTA RT-VIM-S-026-12, Rev. 1

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Vehicle Inspection and Maintenance Working Group

Rail Transit Vehicle Passenger Emergency Systems

Abstract: This standard specifies the minimum requirements for passenger emergency systems for rail transit vehicles.

Keywords: cameras, communications, emergency lighting, emergency signage, event recorder, low-location exit path marking, ventilation

Summary: This document establishes the minimum requirements for passenger emergency systems for new rail transit vehicles. Additional recommended practices and guidelines are provided to support rail transit agencies in defining supplementary equipment that may be applicable for the specific operation.

APTA rail transit system members have expressed a commitment to increase the effectiveness of safety devices and features present on rail transit vehicles, not only for the passengers but also for operators and emergency response personnel.

Foreword

The American Public Transportation Association is a standards development organization in North America. The process of developing standards is managed by the APTA Standards Program's Standards Development Oversight Council (SDOC). These activities are carried out through several standards policy and planning committees that have been established to address specific transportation modes, safety and security requirements, interoperability, and other topics.

APTA used a consensus-based process to develop this document and its continued maintenance, which is detailed in the manual for the APTA Standards Program. This document was drafted in accordance with the approval criteria and editorial policy as described. Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

This document was prepared by the Vehicle Inspection and Maintenance Working Group as directed by the Rail Standards Policy Planning Committee.

This document represents a common viewpoint of those parties concerned with its provisions, namely transit operating/planning agencies, manufacturers, consultants, engineers, and general interest groups. APTA standards are mandatory to the extent incorporated by an applicable statute or regulation. In some cases, federal and/or state regulations govern portions of a transit agency's operations. In cases where there is a conflict or contradiction between an applicable law or regulation and this document, consult with a legal adviser to determine which document takes precedence.

This document supersedes APTA RT-VIM-S-026-12, which has been revised. Below is a summary of changes from the previous document version:

- "Abstract" and "Scope and purpose" of standard updated to include retrofit, overhaul, and replacement of passenger emergency systems.
- Provisions for covert devices were removed, as covert devices are not a requirement and can be implemented at the discretion of the rail transit agency.
- Reference to covert devices, emergency preparedness and emergency system removed from keywords, as those terms no longer appear in the standard.
- "Abstract" and "Summary" sections revised for consistency among emergency systems standards for rail transit vehicles.
- Language revised to refer to "agency" rather than "system," where applicable.
- Lists for emergency tool considerations generalized to avoid potential gaps.
- Added emergency communications backup power requirements (CFR §238.121) used in PRESS Emergency Communications standard.
- Language for ADA considerations generalized, where applicable (e.g., mobility devices).
- Consideration for driverless systems added, where applicable (communication with OCCs).
- Changed "train" to "rail transit vehicle" for consistency.
- Removed or revised provisions for cameras, video monitoring and recorders as needed to keep sections specific to the scope of emergency systems.
- Added reference to APTA IT-CCTV-RP-001-11, "Selection of Cameras, Digital Recording Systems, Digital High-Speed Networks and Trainlines for Use in Transit-Related CCTV Systems," for additional guidance on the selection of cameras and video recording equipment.

- Added reference to APTA RT-OP-RP-024-19, “Crash and Fire Protected Inward and Outward Facing Audio and Image Recorders in Rail Transit Operating Compartments.”
- Added language for agencies to determine emergency system requirements based on System Safety Program Plan and/or performance of a hazard analysis, where applicable.
- Added “Inspection and maintenance” section.
- Added definition and abbreviation for System Safety Program Plan.
- Renamed section titled, “Note on alternate practices” to “Note on Equivalent Alternative Practices” and moved to an appendix.

Table of Contents

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Introduction

This introduction is not part of APTA RT-VIM-S-026-12, "Rail Transit Vehicle Passenger Emergency Systems."

This standard outlines the minimum requirements for the passenger emergency systems that apply to rail transit agencies when purchasing new vehicles or replacing existing passenger emergency equipment.

This standard applies to the following entities:

- individuals or organizations that operate rail transit systems;
- individuals or organizations that contract with others for the operation of rail transit systems; and
- individuals or organizations that influence how rail transit systems are operated (including but not limited to consultants, designers and contractors).

Scope and purpose

This standard applies to rail transit agencies that are procuring new vehicles, retrofitting existing vehicles or overhauling existing vehicles. Rail transit agencies shall consult this standard to determine minimum requirements for passenger emergency systems. Additional guidance is provided to assist the rail transit agency in determining the need and type of supplementary passenger emergency systems that may be necessary for their specific operation.

The purpose of this standard is to provide a common foundation for all transit agencies to establish the full scope of vehicle passenger emergency systems necessary for each specific operation.

Rail Transit Vehicle Passenger Emergency Systems

1. Emergency exits

New rail transit vehicles shall be designed to provide a means of emergency egress from the car and emergency access into the car in accordance with APTA RT-VIM-S-023-12, "Emergency Egress/Access for Rail Transit Vehicles."

2. Operator protection

New rail transit vehicles shall be designed to provide adequate protection for the operator in the event of an emergency. Areas that must be considered include the following:

1. **Crashworthiness:** Survivable space of the operator shall be preserved in accordance with one of the following approaches:
    - Crash energy management design in accordance with ASME RT-1/ASME RT-2/EN 15227 as defined in the technical specification.
    - End structure designed with conventional static end load requirements (e.g., centerline of draft compression, end sill compression, collision post, corner post, anti-climber) as defined in the technical specification.
2. **Cab seats:** Cab seats shall be securely mounted. Attachment strength shall be in accordance with APTA PR-CS-S-011-99, "Cab Crew Seating Safety Requirements," except that the longitudinal level shall be reduced from 8g to 5g.
3. **Cab windows:** Windshields shall be compliant with 49 CFR §223 for Type 1 Glazing. Cab side windows shall be compliant with 49 CFR §223 for Type II glazing. The evaluation shall include the window frame in the testing.
4. **Cab doors:** If equipped, cab doors shall have a secure and operable latching device. Cab doors shall also be equipped with a panic bar.
5. **Sharp edges and corners:** Sharp edges and corners shall be either avoided or padded to mitigate the consequences of an impact with such surfaces.

In addition, the guidelines outlined in APTA RT-VIM-RP-025-15, "Operator Protection Features for Rail Transit Vehicles," should be reviewed to determine what operator protection design features should be considered for the type of vehicle and its operating environment.

Overhauled rail transit vehicles must consider all the features outlined in this section with the exclusion of crashworthiness.

3. Emergency lighting

New rail transit vehicles shall be designed to have an emergency lighting system to facilitate the ability of passengers, train crew members and/or emergency responders to see and orient themselves and to identify obstacles to assist them in safely moving throughout the passenger car and to see outside the passenger car to

assess conditions of safety. The emergency lighting system shall comply with the requirements of APTA RT-VIM-S-020-10, “Emergency Lighting System Design for Rail Transit Vehicles.”

4. Emergency signage

New rail transit vehicles shall be designed to have an emergency signage system to provide evacuation guidance for passengers and train crew members and rescue access guidance for emergency responders. The emergency signage system shall comply with the requirements of APTA RT-VIM-S-021-10, “Emergency Signage for Rail Transit Vehicles.”

5. Low-location exit path marking

New rail transit vehicles shall be designed to have an emergency low-location exit path marking (LLEPM) system to identify the location of primary door exits and the exit path to be used to reach such doors by passengers and rail transit personnel under conditions of darkness when normal and emergency sources of illumination are obscured or inoperative. The LLEPM system shall comply with the requirements of APTA RT-VIM-S-022-10, “Low-Location Exit Path Marking.”

6. Emergency equipment

The rail transit agency shall equip each new vehicle with emergency equipment that can be used by both crew and passengers in the event of an emergency. It should be noted that a detailed and comprehensive listing of specific emergency equipment that should be stored and maintained on a rail transit vehicle is not universal across all agencies. The emergency equipment on the vehicles shall be defined in the rail transit agency’s System Safety Program Plan (SSPP) and will be specific to the type of vehicle and its operating environment.

Rail transit agencies shall define the emergency equipment required for their rail transit system as part of their SSPP, based on a hazard assessment that considers the different aspects of the agency’s vehicle design, operating environment and emergency response procedures, including the following:

- Type of power supply and the associated need for protective equipment or insulators to reduce risk associated with human contact with these power sources.
- Type of vehicle and the associated need for boarding/alighting devices to facilitate quick and easy exit from the vehicle whether the vehicle is at a station or between stations.
- Type of right-of-way and the associated need for direction signs and symbols, handheld voice amplification systems, handheld light sources, or other related equipment to help direct passengers exiting vehicles.

7. Emergency communications

The public address and intercom system shall be compliant with 49 CFR §238.121(c)(1)-(3). The public address and intercom system shall have a backup power system capable of powering each system to allow intermittent emergency communication for a minimum period of 90 minutes. Intermittent communication shall be considered equivalent to continuous communication during the last 15 minutes of the 90-minute minimum period. The public address system may be part of the same system as the intercom system.

7.1 Public address system

New rail transit vehicles shall be equipped with a public address system that provides a means for a crew member and/or the Operations Control Center to communicate to rail transit vehicle passengers in an emergency. The public address system shall also provide a means for a crew member and/or the OCC to communicate in an emergency with people in the immediate vicinity of the vehicle (e.g., on the station platform).

7.2 Intercom system

New rail transit vehicles shall be equipped with an intercom system that provides a means for passengers to communicate with crew members and/or the OCC in an emergency. Intercom stations shall be provided at all locations designated for mobility devices and a minimum of two additional locations within the vehicle. On a per-side basis, the distance between one end of the passenger compartment and an intercom, as well as the distance between two intercoms, shall not exceed 30 ft in either direction. The intercom shall be accessible to passengers without requiring the use of a tool or other implement.

The location of each intercom intended for passenger use shall be clearly marked with luminescent material. Operating instructions shall be posted at or near each such intercom. See APTA RT-VIM-S-021-10, "Emergency Signage for Rail Transit Vehicles," for guidance on the design of the emergency signage.

7.3 Cab-to-cab intercommunications

New rail transit vehicles shall be equipped with an operator's cab-to-cab intercommunications system that will permit communications between operators or approved individuals in other vehicle cabs of the same train consist.

8. Cameras and video monitors

This standard outlines minimum requirements and recommended practices for a rail transit agency procuring new vehicles with cameras and monitoring devices or replacing existing cameras and monitoring devices. Additional guidelines for the selection of cameras and video recording equipment are provided in APTA IT-CCTV-RP-001-11, "Selection of Cameras, Digital Recording Systems, Digital High-Speed Networks and Trainlines for Use in Transit-Related CCTV Systems," and APTA RT-OP-RP-024-19, "Crash and Fire Protected Inward and Outward Facing Audio and Image Recorders in Rail Transit Operating Compartments."

8.1 Video monitoring

The vehicle exterior and interior shall be equipped with video cameras that allow continuous monitoring. Provisions for access to the live feed should be determined by the SSPP with input from emergency response personnel. The operator or OCC should have the capability to selectively monitor the external and internal cameras from the cab of the rail transit vehicle or remotely, respectively in accordance with the agency's SSPP.

8.2 External video cameras

The rail transit agency should determine the number and location of external cameras required for the vehicle as part of its SSPP.

The external cameras shall be capable of providing color video and optimal viewing coverage under all environmental conditions, including low illumination levels.

8.3 Internal video cameras

Internally mounted cameras shall be capable of providing color video and optimal viewing coverage under all environmental conditions, including low illumination levels. Cameras shall be vandal-resistant.

The rail transit agency should determine the number and location of internal cameras required for the vehicle as part of its SSPP.

8.4 Video recorders

A video recorder should be provided in each vehicle to continuously record each of the camera inputs in that vehicle whenever the vehicle is operating. The video recording system should record markers for the activation of emergency devices. Additional guidelines for the selection of video recording equipment are provided in APTA IT-CCTV-RP-001-11, "Selection of Cameras, Digital Recording Systems, Digital High-Speed Networks and Trainlines for Use in Transit-Related CCTV Systems."

8.5 Video monitors

Monitors that display color video should be provided. The number, location and size of the monitors should be determined by the rail transit agency as part of its SSPP. Signals from the left-side camera should be displayed on the left-side monitor or the left side of the screen, and signals from the right-side camera should be displayed on the right.

9. Ventilation control

New vehicles shall be equipped with a means for shutting down ventilation on a complete train basis from any operator's cab in the train. The system should be designed such that the initiation of the complete train shutdown of the ventilation system must be deliberate and intentional and must minimize the chances of unintentional activation (e.g., breaking a protective seal before activation). Any new non-cab vehicles may be equipped with a smoke detector ventilation shutdown system, at the discretion of the rail transit agency, but through a means not accessible to passengers.

10. Event recorder

New rail transit vehicles shall be equipped with an event recorder system with a crash-hardened memory module in compliance with IEEE Std 1482.1, "Standard for Rail Transit Vehicle Event Recorders," latest revision.

11. Inspection and maintenance

Inspection and testing should be conducted at regular intervals in accordance with the rail transit agency's established procedures and original equipment manufacturer recommendations.

Referenced APTA standards

APTA PR-CS-S-011-99, "Cab Crew Seating Safety Requirements"
APTA RT-VIM-S-020-10, "Emergency Lighting System Design for Rail Transit Vehicles"
APTA RT-VIM-S-021-10, "Emergency Signage for Rail Transit Vehicles"
APTA RT-VIM-S-022-10, "Low Location Exit Path Marking"
APTA RT-VIM-S-023-12, "Emergency Egress/Access for Rail Transit Vehicles"
APTA RT-VIM-RP-025-15, "Operator Protection Features for Rail Transit Vehicles"
APTA IT-CCTV-RP-001-11, "Selection of Cameras, Digital Recording Systems, Digital High-Speed Networks and Trainlines for Use in Transit-Related CCTV Systems"
APTA RT-OP-RP-024-19, "Crash and Fire Protected Inward and Outward Facing Audio and Image Recorders in Rail Transit Operating Compartments."

Definitions

consist: One or a group of cars acting as one unit and controlled by one operator from the driving operating cab.

System Safety Program Plan: A document developed and adopted by the rail transit agency, describing its safety policies, objectives, responsibilities and procedures.

Abbreviations and acronyms

CFR Code of Federal Regulations
LLEPM low-location exit path marking
OCC Operations Control Center
PA public address
SSPP System Safety Program Plan

Document history

Document Version	Working Group Vote	Public Comment/ Technical Oversight	Rail CEO Approval	Policy & Planning Approval	Publish Date
First published	—	—	—	—	Dec. 1, 2012
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Appendix

Note on Equivalent Alternative Practices

Individual rail transit systems may modify the practices in this standard to accommodate their specific equipment and mode of operation. APTA recognizes that some rail transit agencies may have unique operating environments that make strict compliance with every provision of this standard overly burdensome. As a result, a rail transit agency may develop alternative equivalent practices to APTA standards so long as the equivalent alternates are based on a safe operating history and documented in the safety management process. Documentation of equivalent alternate practices shall:

- Identify the specific APTA rail transit safety standard requirements that cannot be met.
- State why each of these requirements cannot be met.
- Describe the alternate equivalent methods used.
- Describe and substantiate how the alternate equivalent methods do not compromise safety and provide a level of safety equivalent to the practices in the APTA safety standard (operating histories or hazard analysis findings may be used to substantiate this claim).