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IEEE Standard for Performance of DC Overhead Current Collectors for Rail Transit Vehicles

IEEE Vehicular Technology Society

Sponsored by the
Overhead Contact Systems Subcommittee
of the
Rail Transportation Standards Committee

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Abstract: The general characteristics of pantographs that enable current collection from an overhead contact system on light rail and heavy rail transit systems are described. Definitions pertinent to pantographs, including general definitions, specific pantograph terminology, pantograph components, pantograph dimensions, and operating characteristics are contained in the standard.
The operating requirements that need to be defined by the purchaser of pantographs are stated. In addition, standard dimensions for the collector head and contact strip, various pantograph mechanical and operational requirements, environmental conditions, and maintainability and documentation requirements are specified. Various testing methodologies and requirements are also included.

Keywords: collector head, contact strip, gradient, heavy rail, IEEE 1629™, light rail, overhead contact system, pantograph, rail vehicle, railway, streetcar, tracking, traction, tramcar, transit

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Introduction

This introduction is not part of IEEE Std 1629™-2013, IEEE Standard for Performance of DC Overhead Current Collectors for Rail Transit Vehicles.

The Overhead Contact Systems Subcommittee of the Rail Transportation Standards Committee was formed in 2001 with the purpose of developing standards governing the design and construction of overhead contact systems for rail transit. The primary concern of the Overhead Contact Systems Subcommittee Working Group 16 was the lack of uniform practices and applications for the design and implementation of pantographs used on rail transit vehicles.

The majority of the presently operating electrified rail transit systems use an overhead contact system (OCS) or third rail to supply traction and auxiliary power to the vehicles. This standard was initially developed for pantograph collection devices, and will address trolley poles and other collection devices at a later time.

This standard specifies:

- Definitions pertaining to pantographs used on direct current (dc) or alternating current (ac) powered rail transit vehicles
- Performance requirements for pantograph equipment used on dc or ac powered rail transit vehicles
- Requirements for testing of pantographs used on dc or ac powered rail transit vehicles

This standard does not consider

- Specific maintainability or reliability requirements for pantographs
- Pantographs for operation on electrified main-line commuter railroads or high-speed railroad systems

This standard is intended to apply to rail transit vehicles that are electrically powered by an overhead contact system. These rail transit vehicles are defined to include heavy rail vehicles (also called subway, elevated, or rapid transit cars) and light rail vehicles (also called streetcars, tramcars, or trolley cars), including units which combine powered and unpowered trucks or axles.

This standard does not apply to electrically powered main-line railroad vehicles, such as locomotives or electric multiple unit (EMU) cars.

Fully automated, driverless rail transit vehicles are sometimes included in the mode of transit referred to as automated guideway transit (AGT), and, to the extent that the vehicles do not have other unique requirements, this standard can be applied. It is not intended that this standard be universally required for all AGT systems.

NOTE—Self-propelled railway vehicles operating on trackage of the general railroad system are subject to regulations issued by governmental bodies (e.g., federal, state, and local bodies). In selected jurisdictions this is also true for rail transit vehicles. The user of this Standard should recognize that such regulations always take precedence over a consensus standard.

This standard applies to pantographs used on light rail vehicles and subway/metro rapid transit cars, where the electrical power for the operation of the propulsion and auxiliary systems is supplied from a dc or single-phase ac, conventionally suspended, overhead contact system, with a nominal voltage of 600 volts and above.

Contents

IEEE Standard for Performance of DC Overhead Current Collectors for Rail Transit Vehicles

1. Overview

1.1 Scope

This standard provides minimum acceptable performance requirements for overhead current collectors used for light rail vehicles, heavy rail vehicles, and trolley bus vehicles. Specific areas to be addressed include oscillation of collectors, arcing and electrical transients, all weather operation, the wire/collector interface, and dewirement and entanglement hazards.

1.2 Purpose

The purpose of this standard is to develop performance requirements for overhead current collectors on transit vehicles to control hazards, improve performance and reliability, and reduce life cycle cost.