

AMTRAK EQUIPMENT MAINTENANCE DEPARTMENT  
STANDARD MAINTENANCE PROCEDURE

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TITLE : Design Criteria for Operating Speeds of Private  
and Railroad Business Cars  
EQUIPMENT TYPE: Private and Railroad Business Cars

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1.0 Scope

The following is intended to set forth the standards that the owners of private and railroad business cars must meet in order to qualify for maximum operating speeds of 90 and 105 mph. This document is intended to supplement the existing Amtrak rules, regulations, tariffs, and inspection procedures currently applicable to the above cars.

2.0 Design Features of Truck Assembly

- 2.1 The design features listed below are characteristic of the GSI Commonwealth four-wheel or six-wheel truck arrangements. Car owners possessing cars with trucks that do not fall into this category will be treated in accordance with the procedure in Section 2.4.
- 2.2 To qualify for a design speed of 105 mph, the truck assemblies and associated running gear must contain the following design features:
- 1) Axle load capacity shall be in accordance with Section 5.23 of Section G, Part II of the AAR Manual of Standards and Recommended Practices for 100 mph.
  - 2) Roller Bearings
  - 3) Primary & Secondary Suspension
  - 4) Central Bearing type center pivot or center plate with constant side bearings.

- 5) Longitudinal forces (tractive effort and braking) shall be transmitted through a bolster anchor arrangement or chaffing plates in accordance with the manufacturer's general arrangement drawings.
  - 6) Lateral suspension supporting the truck bolster shall be a swing hanger type design.
  - 7) The truck frame shall be a one piece casting with integral pedestal legs.
  - 8) Wheel load equalization shall be achieved through an equalizer arrangement suspended between journal housings.
  - 9) Side Bearings shall be mounted on the truck bolster and may be of a clearance type if a central bearing is employed. Bridge or arch type side bearings are not permitted.
  - 10) The truck and car body shall meet right-of-way clearance criteria as shown in Amtrak Drawing D-05-1355.
  - 11) Cars having trucks not possessing all of the above features shall be evaluated by Amtrak Equipment Engineering Department and assigned a reduced maximum design speed. This speed restriction will be related to the deviation of the existing truck design from the above criteria.
- 2.3 To qualify for a design speed of 90 mph, the truck assemblies and associated running gear must contain the following design features:
- 1) Axle load capacity shall be in accordance with Section 5.23 of Section G, Part II of the AAR Manual of Standards and Recommended Practices for 90 mph.
  - 2) Roller bearings.
  - 3) Primary and secondary suspension.
  - 4) Side bearings may be contact or clearance type.

- 5) Longitudinal forces (tractive effort and braking) shall be transmitted through a bolster anchor arrangement or chafing plates in accordance with the manufacturer's general arrangement drawings.
- 6) Lateral suspension supporting the truck bolster shall be a swing hanger type design.
- 7) The truck frame shall be cast steel. Pedestal legs may be bolted to or cast integral with the frame.
- 8) Wheel load equalization shall be achieved through an equalizer arrangement suspended between journal housings.
- 9) The truck and car body shall meet right-of-way clearance criteria as shown on Amtrak design D-05-1355.
- 10) Cars having trucks not possessing all of the above features shall not move in Amtrak consists.

#### 2.4 Hybrid Truck Designs

Truck designs, which cannot be evaluated against the criteria above because of a completely different design arrangement, may be submitted to Amtrak Equipment Engineering for evaluation. These trucks shall be evaluated in cooperation with the truck designer and/or truck builder.

Maintenance standards shall be based on the truck design firm's recommendations or the standards listed below.

#### 3.0 Brakes

3.1 Truck brakes shall consist of an approved tread and/or disc brake equipment. Tread brakes must be equipped with an approved high friction composition shoe or cast iron shoe. The brake system shall be an AAR approved passenger car system set up for graduated release. The car owner shall provide brake calculations showing that the car is braked to following criteria for composition shoes or cast iron shoes. All brake pipe reductions are made from

an initial pressure of 110 psig in the brake pipe. A full service brake application is defined as 25 psi reduction from 110 psi in the brake pipe, and emergency brake application as brake pipe exhausted to atmosphere.

Brake Ratios for Cars with Tread Brake High Friction Composition Shoes or Disc Brakes

	<u>Gross Brake Ratio</u>	<u>Net Brake Ratio</u>
Full Service	30% - 33%	20% (minimum)
Emergency	44% - 47%	31% (minimum)

- 3.2 Those cars, equipped with tread brakes using low friction cast iron shoes, are restricted to a maximum speed of 90 mph if no other more restrictive criteria stated elsewhere in this document applies. The car owner shall provide brake calculations showing that the car is braked for the brake ratios listed below.

Brake Ratios for Cars Equipped with Tread Brake Cast Iron Shoes

	<u>Gross Brake Ratio</u>	<u>Net Brake Ratio</u>
Full Service	90%	63% (minimum)
Emergency	150%	105% (minimum)