

Vehicle/Track Interaction Safety Limits

Wheel-Rail Forces ¹			
Parameter	Safety Limit	Filter/ Window	Requirements
Single Wheel Vertical Load Ratio	≥ 0.15	5 ft	No wheel of the vehicle shall be permitted to unload to less than 15 percent of the static vertical wheel load for 5 or more continuous feet. The static vertical wheel load is defined as the load that the wheel would carry when stationary on level track.
Single Wheel L/V Ratio	$\leq \frac{\tan(\delta) - 0.5}{1 + 0.5 \tan(\delta)}$	5 ft	The ratio of the lateral force that any wheel exerts on an individual rail to the vertical force exerted by the same wheel on the rail shall not be greater than the safety limit calculated for the wheel's flange angle (δ) for 5 or more continuous feet.
Net Axle Lateral L/V Ratio	$\leq 0.4 + \frac{5.0}{Va}$	5 ft	The net axle lateral force, in kips, exerted by any axle on the track shall not exceed a total of 5 kips plus 40 percent of the static vertical load that the axle exerts on the track for 5 or more continuous feet. <i>Va</i> = static vertical axle load (kips)
Truck Side L/V Ratio	≤ 0.6	5 ft	The ratio of the lateral forces that the wheels on one side of any truck exert on an individual rail to the vertical forces exerted by the same wheels on that rail shall not be greater than 0.6 for 5 or more continuous feet.

Carbody Accelerations ²			
Parameter	Passenger Cars	Other Vehicles	Requirements
Carbody Lateral (Transient)	$\leq 0.65g$ peak-to-peak 1 sec window ³ excludes peaks < 50 msec	$\leq 0.75g$ peak-to-peak 1 sec window ³ excludes peaks < 50 msec	The peak-to-peak accelerations, measured as the algebraic difference between the two extreme values of measured acceleration in any 1-second time period, excluding any peak lasting less than 50 milliseconds, shall not