

REPRESENTATIVE TEST METHODS - VEHICLE BARRIER CRASH TESTING



	SD-STD-02.01 (April 1985) CERTIFICATION STANDARD Test Method for Vehicle Crash Testing of Perimeter Barriers and Gates	SD-STD-02.01, Revision A (March 2003) CERTIFICATION STANDARD Test Method for Vehicle Crash Testing of Perimeter Barriers and Gates	ASTM F2656-07 Standard Test Method for Vehicle Crash Testing of Perimeter Barriers	ASTM F2656-15 Standard Test Method for Crash Testing of Vehicle Security Barriers	PAS 68:2010 Impact test specifications for vehicle security barriers	IWA 14-1:2013(E) Vehicle security barriers — Part 1: Performance requirement, vehicle impact test method and performance rating
Vehicle Types	U.S. medium duty trucks - tested at gross vehicle weight of 6800 kg (15,000 lb)	U.S. medium duty trucks - tested at gross vehicle weight of 6800 kg (15,000 lb)	Small passenger car (C) - 1100 kg (2430 lbs) Pickup truck (P) - 2300 kg (5070 lbs) Medium duty truck (M) - 6800 kg (15,000 lbs) Heavy goods vehicle (H) - 29,500 kg (65,000 lbs)	Small passenger car (SC) - 1100 kg (2430 lbs) Full size sedan (FS) - 2100 kg (4630 lbs) Pickup truck (PU) - 2300 kg (5070 lbs) Standard test truck (M) - 6800 kg (15,000 lbs) Class 7 cabover (C7) - 7200 kg (15,873 lbs) Heavy goods vehicle (H) - 29,500 kg (65,000 lbs)	Car (M1) - 1500 kg 4x4 single cab pickup (M2) - 2500 kg 3500 kg RWD flat bed day cab (N1) - 3500 kg 7500 kg 2-axle rigid day cab (N2) - 7500 kg 18000 kg 2-axle rigid day cab (N3) - 7500 kg 32000 kg 4-axle rigid day cab (N4) - 30000 kg	Car (M1) - 1500 kg 4x4 crew cab pickup (N1G) - 2500 kg Single cab flat bed (N1) - 3500 kg 7500 kg 2-axle rigid day cab (N2A) - 7200 kg 12000 kg 2-axle rigid day cab (N2B) - 7200 kg 18000 kg 2-axle rigid day cab (N3C) - 7200 kg 15000 kg 2-axle rigid day cab (N3D) - 12000 kg 29500 kg 3-axle rigid day cab (N3E) - 24000 kg 32000 kg 4-axle rigid day cab (N3F) - 30000 kg
Impact Angle	90 degrees	90 degrees	90 degrees	90 degrees	Any angle between 0 and 90 degrees, in 5 degree intervals. Part of rating.	Any angle between 0 and 90 degrees, in 5 degree intervals. Part of rating.
Impact Speeds	80 kph (50 mph) 65 kph (40 mph) 50 kph (30 mph)	80 kph (50 mph) 65 kph (40 mph) 50 kph (30 mph)	100 kph (60 mph) 80 kph (50 mph) 65 kph (40 mph) 50 kph (30 mph)	100 kph (60 mph) 80 kph (50 mph) 65 kph (40 mph) 50 kph (30 mph)	16 kph (10 mph) 32 kph (20 mph) 48 kph (30 mph) 64 kph (40 mph) 80 kph (50 mph) 96 kph (60 mph) 112 kph (70 mph)	16 kph (10 mph) 32 kph (20 mph) 48 kph (30 mph) 64 kph (40 mph) 80 kph (50 mph) 96 kph (60 mph) 112 kph (70 mph)
Impact / Test Condition Designations	K12 (for 80 kph impact) K8 (for 65 kph impact) K4 (for 48 kph impact)	K12 (for 80 kph impact) K8 (for 65 kph impact) K4 (for 48 kph impact)	C40, C50, C60 P40, P50, P60 M30, M40, M50 H30, H40, H50	SC30, SC40, SC50, SC60 FS30, FS40, FS50, FS60 PU30, PU40, PU50, PU60 M30, M40, M50 C730, C740, C750 H30, H40, H50	M1: 1500-16, 1500-32, 1500-48, 1500-64, 1500-80, 1500-96, 1500-112 M2: 2500-16, 2500-32, 2500-48, 2500-64, 2500-80, 2500-96, 2500-112 N1: 3500-16, 3500-32, 3500-48, 3500-64, 3500-80, 3500-96 N2: 7500-16, 7500-32, 7500-48, 7500-64 N3: 7500-16, 7500-32, 7500-48, 7500-64, 7500-80 N4: 30000-16, 30000-32, 30000-48, 30000-64, 30000-80	No specific designation for impact/test condition. Vehicles in the following classifications can be tested at the listed speeds (km/h): M1: 16, 32, 48, 64, 80, 96, 112 N1G: 16, 32, 48, 64, 80, 96, 112 N1: 16, 32, 48, 64, 80, 96 N2: 16, 32, 48, 64, 80 N3: 16, 32, 48, 64, 80
Penetration Ratings (Dynamic Penetration)	L3 ≤ 1 m (3.3 ft) L2 1.01 to 6 m (3.31 to 20 ft) L1 6.01 to 15 m (20.1 to 50 ft)	Must be 1 meter or less - "pass or fail"	P1 ≤ 1m (3.3 ft) P2 1.01 to 7 m (3.31 to 23.0 ft) P3 7.01 to 30 m (23.1 to 98.4 ft) P4 30 m (98 ft) or greater	P1 ≤ 1m (3.3 ft) P2 1.01 to 7 m (3.31 to 23.0 ft) P3 7.01 to 30 m (23.1 to 98.4 ft)	Actual dynamic penetration distance recorded and included in rating.	Actual dynamic penetration distance recorded and included in rating.
Vehicle / Barrier Debris	Not included in rating; described in report	Not included in rating; described in report	Not included in rating; described in report	Not included in rating; described in report	Dispersion distance of major debris recorded and included in rating.	Not included in rating; dispersion distance of major debris recorded and included in report.
Example Specification Callout	K12-L3 per SD-STD-02.01	K12 per SD-STD-02.01, Revision A	M50-P1 per ASTM F2656-07 M50 = test condition (M - truck, 50 - 50 mph); P1 = max penetration classification (≤ 1m)	M50-P1 per ASTM F2656-15 M50 = test condition (M - truck, 50 - 50 mph); P1 = max penetration classification (≤ 1m)	PAS 68:2010 V/7500(N3)/48/90:2.0/3.4 V = test method; 7500(N3) = vehicle classification (7500 kg N3 truck); 48 = impact speed (48 km/h); 90 = impact angle (90 deg); 2.0 = max dynamic vehicle penetration (m); 3.4 = dispersion of major debris (m)	IWA 14-1:2013 Blocker V/2500(N1G)/48/90:7.6 Blocker: model/type of barrier; V = test method; 2500 = test vehicle mass (2500 kg); N1G = vehicle classification (pickup); 48 = impact speed (48 km/h); 90 = impact angle (90 deg); 7.6 = max dynamic vehicle penetration (7.6 m)
Test Notes		Compared to previous version, vehicle configuration specifications tightened up; "L" penetration ratings removed and pass ratings only generated for penetration distances < 1.0m; penetration measurement locations changed from leading edge of truck to leading edge of cargo bed and from outside of barrier to inside of barrier	Dynamic penetration measured from rear face of system.	Dynamic penetration measured from rear face of system.	Dynamic penetration measured from rear face of system.	Dynamic penetration measured from front face of system.
Usage Notes		Not currently used to test vehicle barriers; ASTM F2656-07 currently used to evaluate barriers for DoS site usage. Last certified list published 9/2008. Barriers tested to Rev. A are sometimes incorrectly rated by the manufacturer using the previous "L" penetration distances. (DOD may issue these L ratings, however, if they certify them for use at DOD facilities.)	Barrier ratings are sometimes designated without the penetration rating (e.g. "M50 barrier"); this is incorrect usage. Penetration ratings must be included in the barrier rating description.	Barrier ratings are sometimes designated without the penetration rating (e.g. "M50 barrier"); this is incorrect usage. Penetration ratings must be included in the barrier rating description.	Design method permitted for variations or modifications to existing systems. "D" instead of "V" used as prefix in rating.	PAS-68 used as basis of creation, but IWA standard has changes in vehicle types, penetration measurement location