Commercial Vans

Safety Assist

Test & Assessment Protocol

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Contents

Definitions

Throughout this protocol the following terms are used:

Adaptive Cruise Control (ACC) – a system that controls the vehicle speed while maintaining a set distance to vehicles ahead.

Autonomous Emergency Braking (AEB) – braking that is applied automatically by the vehicle in response to the detection of a likely collision to reduce the vehicle speed and potentially avoid the collision.

Blind Spot Information System (BLIS) – a warning that is provided automatically by the van in response to the detection of overtaking traffic in the adjacent lane.

Commercial Van (CV) – a Light Commercial Vehicle (excluding M1 based panel vans) used for the carriage of goods of the categories:

- N1 (*as per UN ECE/TRANS/WP.29/78/Rev.6,* with a maximum mass not exceeding 3.5 tonnes)
  or
- N2 (with a maximum mass exceeding 3.5 tonnes but not exceeding 8 tonnes)*
  *See 1.1.1 Vehicle categorization

Driver State Monitoring (DSM) – System that is able to (in)directly determine the state of the driver

Emergency Lane Keeping (ELK) – default ON heading correction that is applied automatically by the van in response to the detection of the van that is about to drift beyond a solid lane marking, the edge of the road or into oncoming or overtaking traffic in the adjacent lane.

Forward Collision Warning (FCW) – an audio-visual warning that is provided automatically by the vehicle in response to the detection of a likely collision to alert the driver.

Global Vehicle Target (GVT) – means the vehicle target used in this protocol as defined in ISO 19206-3:2021.

Gross Vehicle Weight (GVW) – means the value specified by the manufacturer as the maximum total loaded weight of a single vehicle, given in kilograms [Kg].

Intelligent Adaptive Cruise Control (iACC) – iACC is an ACC combined with SLIF, where the speed is set by the SLIF with or without driver confirmation.

Intelligent Speed Limiter (ISL) – ISL is a SLF combined with SLIF, where the Vadj is set by the SLIF with or without driver confirmation.

Lane Departure Warning (LDW) – a warning that is provided automatically by the van in response to the van that is about to drift beyond a delineated edge line of the current travel lane.

Lane Keeping Assist (LKA) – heading correction that is applied automatically by the van in response to the detection of the van that is about to drift beyond a delineated edge line of the current travel lane.
Lane Support System (LSS) – a system that corrects the van heading to keep the van within its driving lane and/or warns the driver.

Occupant Status Monitoring (OSM) – a system that monitors the status of a van occupant. In this protocol, OSM can refer to SBR or DSM.

Seat Belt Reminder (SBR) – System that indicates the status of the seatbelt whether it is in use or not in use.

Speed Assist System (SAS) –a system that informs or warns the driver and/or controls the vehicle speed.

Speed Limit Information Function (SLIF) – a function with which the vehicle knows and communicates the speed limit.

Speed Limitation Function (SLF) – SLF means a system which allows the driver to set a vehicle speed Vadj, to which he/she wishes the speed of his car to be limited and above which he/she wishes to be warned.

Time to Collision (TTC) – means the remaining time before the VUT strikes the GVT, assuming that the VUT and GVT would continue to travel with the speed it is travelling.

Van-to-Bicyclist Farside Adult 50% (VBFA-50) – a collision in which a van travels forwards towards a bicyclist crossing its path cycling from the farside and the frontal structure of the van strikes the bicyclist at 50% of the van's width when no braking action is applied.

Van-to-Bicyclist Longitudinal Adult 25% (VBLA-25) – a collision in which a van travels forwards towards a bicyclist cycling in the same direction in front of the van, where the van would strike the cyclist at 25% of the van's width when no braking action is applied or an evasive steering action is initiated after an FCW.

Van-to-Bicyclist Longitudinal Adult 50% (VBLA-50) – a collision in which a van travels forwards towards a bicyclist cycling in the same direction in front of the van, where the van would strike the cyclist at 50% of the van's width when no braking action is applied.

Van-to-Bicyclist Nearside Adult 50% (VBNA-50) – a collision in which a van travels forwards towards a bicyclist crossing its path cycling from the nearside and the frontal structure of the van strikes the bicyclist when no braking action is applied.
Van-to-Bicyclist Nearside Adult Obstructed 50% (VBNAO-50) – a collision in which a van travels forwards towards a bicyclist crossing its path cycling from the nearside from behind an obstruction and the frontal structure of the van strikes the bicyclist at 50% of the van's width when no braking action is applied

Van-to-Car Front turn-across-path (VCFtap) – a collision in which a van turns across the path of an oncoming vehicle travelling at constant speed, and the frontal structure of the van strikes the front structure of the other vehicle.
Van-to-Car Rear braking (VCRb) – a collision in which a van travels forwards towards another vehicle that is travelling at constant speed and then decelerates, and the frontal structure of the van strikes the rear structure of the other vehicle.

Van-to-Car Rear moving (VCRm) – a collision in which a van travels forwards towards another vehicle that is travelling at constant speed and the frontal structure of the van strikes the rear structure of the other.

Van-to-Car Rear stationary (VCRs) – a collision in which a van travels forwards towards another stationary vehicle and the frontal structure of the van strikes the rear structure of the other.

Van-to-Pedestrian Farside Adult 50% (VPFA-50) – a collision in which a van travels forwards towards an adult pedestrian crossing its path running from the farside and the frontal structure of the van strikes the pedestrian at 50% of the van's width when no braking action is applied.

Van-to-Pedestrian Longitudinal Adult 25% (VPLA-25) – a collision in which a van travels forwards towards an adult pedestrian walking in the same direction in front of the van, where the van strikes the pedestrian at 25% of the van's width when no braking action is applied or an evasive steering action is initiated after an FCW.

Van-to-Pedestrian Longitudinal Adult 50% (VPLA-50) – a collision in which a van travels forwards towards an adult pedestrian walking in the same direction in front of the van, where the van strikes the pedestrian at 50% of the van's width when no braking action is applied.

Van-to-Pedestrian Nearside Adult 25% (VPNA-25) – a collision in which a van travels forwards towards an adult pedestrian crossing its path walking from the nearside and the frontal structure of the van strikes the pedestrian at 25% of the van's width when no braking action is applied.

Van-to-Pedestrian Nearside Adult 75% (VPNA-75) – a collision in which a van travels forwards towards an adult pedestrian crossing its path walking from the nearside and the frontal structure of the van strikes the pedestrian at 75% of the van's width when no braking action is applied.

Van-to-Pedestrian Nearside Child Obstructed 50% (VPNCO-50) – a collision in which a van travels forwards towards a child pedestrian crossing its path running from behind and obstruction from the nearside and the frontal structure of the van strikes the pedestrian at 50% of the van's width when no braking action is applied.

Van-to-Pedestrian Reverse Adult 50% (VPRA-50) – a collision in which a van travels rearwards towards an adult pedestrian crossing its path walking from the nearside and the

rear structure of the van strikes the pedestrian at 50% of the van's width when the VUT continuous at constant speed.

Van-to-Pedestrian Reverse Adult stationary (VPRA-s) – a collision in which a van travels rearwards towards an adult pedestrian standing still, facing sideways and the rear structure of the van strikes the pedestrian at 25, 50 or 75% of the van's width when the VUT continuous at constant speed.

Van-to-Pedestrian Turning Adult 50% (VPTA-50) – a collision in which a van turns towards an adult pedestrian crossing its path walking from the opposite direction at an intersection (before the VUT made the turn) and the frontal structure of the van strikes the pedestrian at 50% of the van's width when no braking action is applied.

Vehicle Under Test (VUT) – means the vehicle tested according to this protocol with a pre-crash collision mitigation or avoidance system on board.

1 Introduction

Euro NCAP's Commercial Van Safety ratings are designed to encourage wider fitment of ADAS, promote robust performance and help fleet operator and business owners to make safer choices. More precisely, the van ratings aim to:

- Accelerate standardisation of safety functions on commercial vans ahead of, and over and beyond, the basic requirements of the General Safety Regulation 2;
- Improve performance of advanced driver assistance systems (ADAS) on commercial vans, to match the state-of-the-art technology fitted to passenger cars;
- Call on fleet operators to take responsibility for the safety of their drivers and to demand a minimum silver-level performance in Euro NCAP's new ranking scheme when making purchasing decisions;
- Improve information from commercial van manufacturers, on websites and in marketing material, regarding the safety features available on their vehicles.

This Commercial Vans Test and Assessment Protocol is an addendum to the existing passenger car safety testing protocols and details specific requirements relating to the safety testing of Commercial Vans. It also describes the details of the overall scoring of Commercial Vans.

1.1 Scope

1.1.1 Vehicle categorization

1. N1 commercial vehicles will be assessed in accordance with the Euro NCAP Commercial Vans protocol
2. N2 commercial vehicles can be assessed in in accordance with the Euro NCAP Commercial Vans protocol and/or the Euro NCAP Heavy Goods Vehicle protocol.
    - The choice which protocol to apply shall be made by the sponsor and must be confirmed by the secretariat taking into consideration body features, commercial competitor vehicles and target use conditions of the intended vehicle.
3. N3 commercial vehicles will be assessed in accordance with the Euro NCAP Heavy Goods Vehicle protocol

1.1.2 Protocol Reference

The tests in scope for the 2023/2024 assessment of CVs are based on those applicable for the safety rating of passenger cars from 1st January 2020, namely:

SAFETY FUNCTION	TEST PROTOCOL	ASSESSMENT PROTOCOL
AEB Van-to-Car	AEB C2C Test Protocol - v3.0.3	Assessment Protocol - SA - v9.1
AEB Pedestrian	AEB VRU Test Protocol - v3.0.4	Assessment Protocol - VRU - v10.0.4
AEB Bicyclist		
Lane Support System	LSS Test Protocol v3.0.2	Assessment Protocol - SA - v10.0.1
Speed Assist System	SAS Test Protocol v2.0	
Occupant Status Monitoring		

Table 1-1 Protocol References

Where this addendum conflicts with the original passenger car safety testing protocol, the details in this addendum shall be applied.

1.2 Fitment Overview

Detailed fitment information of Advanced Driver Assistance Systems is provided (where possible) in the markets of EU-27 countries plus the UK and Norway. The availability (standard, optional or not available) is shown in a graphical format with a corresponding table for each van, system and market respectively on the Euro NCAP website.

1.3 Safety Assist Score

The protocol test scores for AEB Van-to-Car, AEB Pedestrian, AEB Cyclist, LSS, SAS and OSM are scaled using the following maximum scores per safety function:

SAFETY FUNCTION	Scenario	Remark	Score	
			Partial	Total
AEB Van-to-Car	VCRs, VCRm, VCRb	-	17.5	30
	HMI	-	2.5	
	VCFtap	-	10	
AEB Pedestrian	VPFA-50	Day	0.55	10
	VPNA-25, VPNA-75	Day & Night	2.77	
	VPNCO-50	Day	1.11	
	VPLA-25, VPLA-50	Day & Night	2.22	
	VPTA-50	Day	1.11	
	VPRA-50, VPRA-s	Day	2.22	
AEB Bicyclist	VBNA-50	-	1.66	10
	VBLA-50, VBLA-25	-	3.33	
	VBFA-50	-	3.33	
	VBNAO-50	-	1.66	
Lane Support Systems	ELK	Road edge, Solid line, oncoming, overtaking	15	20
	LKA	-	2.5	
	HMI	LDW, BLIS	2.5	
Speed Assist Systems	SLIF, SCF	-	15	15
Occupant Status Monitoring	SBR, DSM* **To be assessed by means of a dossier*	-	15	15
TOTAL	**Scenario**		**100**	

Table 1-2 Safety Assist Score Summary

1.3.1 Overall performance

The scores of each safety function are summed up and combined into an overall score for each van (maximum 100, or 100%). This overall performance score places each van tested in one of the following categories.

CATEGORY	SCORE REQUIRED
PLATINUM	≥ 80%
GOLD	≥ 60%
SILVER	≥ 40%
BRONZE	≥ 20%
NOT RECOMMENDED	< 20%

Table 1-3 Score categories

2 VUT Preparation

2.1 Tyres

Since the VUT may not be tested in brand new condition, the tyres must be representative of those fitted standard by the OEM, and shall be used provided that:

- They are in roadworthy condition (no visible damage), and
- They all have a tread depth of at least 5mm. across the central three quarters of the tyre width, and
- They all are inflated to the specified pressure corresponding to the half laden testing condition.

2.2 Wheel Alignment

Acknowledging the test vehicle may be used rather than brand new, subject it to a vehicle (in-line) geometry check to ensure the geometry is within the tolerances set by the OEM. Where the geometry is not within the manufacturers tolerances the test laboratory should undertake remedial work to return the geometry to within the OEM tolerances.

2.3 Loading

Complete testing with the vehicle half laden to represent typical N1 operation, with 'as tested' mass as follows:

$$As\ tested\ mass\ =\ Test\ ready\ mass\ +\ ((GVW\ -\ Test\ ready\ mass)/2)$$

With 'test ready' mass being:

$$Test\ ready\ mass\ =\ Unladen\ kerb\ mass\ +\ Interior\ load$$

And with 'interior load' being:

$$Interior\ load\ =\ 200kg\ =\ Driver\ +\ test\ equipment\ +\ additional\ required\ ballast$$

The procedure to prepare the van for the load requirements will be followed according to below steps:

a. Fill up the tank with fuel to at least 90% of the tank's capacity of fuel.
b. Check the oil level and top up to its maximum level if necessary. Similarly, top up the levels of all other fluids to their maximum levels if necessary.
c. Ensure that the vehicle has its spare wheel on board, if fitted, along with any tools supplied with the vehicle. Nothing else should be in the car.
d. Ensure that all tyres are inflated according to the manufacturer's instructions for the appropriate loading condition.

e. Measure the front and rear axle masses and determine the total mass of the vehicle. The total mass is the ‘unladen kerb mass’ of the vehicle. Record this mass in the test details.
f. Fit the test equipment in the vehicle (i.e. on-board test equipment and instrumentation , associated cables, cabling boxes and power sources).
g. With the driver and test equipment in the vehicle, weigh the vehicle. Record the driver + test equipment mass by subtracting the new measured mass to the initially measured unladen kerb mass.
h. Calculate the 'additional required ballast’ by subtracting the mass of the driver and test equipment from the required 200kg interior load.
i. If applicable, place weights with a mass of the ‘additional required ballast’. Any items added should be securely attached to the interior of the vehicle.
j. Compare these loads with the ‘unladen kerb mass’.
k. Add additional ballast in the cargo space to increase the ‘test ready’ mass to ‘as tested’ mass, with an overall tolerance of ±1%. Locate the centre of mass of the ballast centrally within the cargo space (longitudinally, laterally and vertically) as far as is as practically possible. If the vertical limit of the cargo space is undefined (e.g. in the case of a flatbed or tipping body) locate the centre of mass of the ballast [0.6]m above the load bed. Ballast must be securely attached to the VUT. If water is used as ballast, it should be used in full containers to prevent the movement under acceleration.
l. Note the ‘as tested’ front/rear axle load distribution may not necessarily remain within 5% of the front/rear axle load distribution of the original ‘unladen kerb mass’, which is acceptable for this testing.

3 Testing

Available ADAS functions (whether optional or standard) on each commercial van are tested using Euro NCAP Test & Assessment protocols (see **Error! Reference source not found.**), a dapted to commercial vans where needed.

3.1 AEB VCR

Prerequisites for scoring points, such as whiplash score and headform and legform scores do not apply. There are no pre-requisites for VCRs 10 to 20 km/h.

3.1.1 Standard procedure

Where a manufacturer provides a grid performance predictions, follow the standard protocol.

3.1.2 Back-up procedure

Given the absence of grid performance predictions, proceed with AEB VCR offset testing as follows:

a. Randomly select the direction of offset and begin with the 50% overlap scenario commencing testing at the lowest VUT test speed. When there is complete avoidance, the subsequent test speed for the next test is incremented with 10 km/h. When there is contact, first perform a test at a test speed 5 km/h less than the test speed where contact occurred. After this test continue to perform the remainder of the tests with speed increments of 5km/h. Stop testing when the speed reduction seen in the test is less than 5km/h, or the relative impact speed is greater than 20 km/h for two consecutive test speeds.
b. Continue with the 75% overlap test scenario offset in the opposite direction to that used for the 50% overlap test. Commence testing at the lowest test speed for the scenario or highest 50% overlap avoidance speed, whichever is greater. Increment subsequent test speeds as described in 4.1.1.
c. Continue with the 100% overlap test scenario. Commence testing at the lowest test speed for the scenario or highest 75% overlap avoidance speed, whichever is greater. Increment subsequent test speeds as described in 4.1.1.
d. For FCW system tests, follow the process outlined in 4.1.1 to 4.1.3 for AEB testing. Only perform tests at the test speeds where there was no avoidance in the AEB function tests for applicable scenarios.
e. To ensure symmetry, retest the 50% and 75% two highest avoidance speeds. Where there is a difference in performance, perform all tests on the other direction of offset.

3.2 AEB VRU

3.2.1 Standard procedure

Where a manufacturer provides a grid prediction, proceed with AEB VRU scenarios (day and night-time) as follows:

a. AEB Pedestrian (VPFA-50, VPNA-25, VPNA-75, VPNCO-50, VPLA-25, VPLA-50):
   - Test highest avoidance speed + 1 random speed
   - Test all mitigations
   - In case of discrepancies with the grid prediction, fall back to the Back-up procedure until prediction is met again

b. AEB Pedestrian (VPTA-50, VPRA-50, VPRA-s):
   - Test according to the standard procedure

c. AEB Bicyclist:
   - Test lowest avoidance speed + Highest avoidance speed + 1 random speed
   - Test all mitigations

In case of discrepancies with the grid prediction, fall back to the Back-up procedure until prediction is met again.

Predictions given by the OEM following a colour scheme as reflected below:

Colour	**Speed reduction**	
	<=40 km/h test speed	**>40 km/h test speed**
Green	Full avoidance	Full avoidance
Yellow	Partial speed reduction	>=20 km/h
Red	No reaction	<20 km/h

Table 3-1 Predictions summary for AEB VRU (Standard Procedure)

3.2.2 Back-up procedure

Given the absence of grid performance predictions, follow the standard protocol and complete all test scenarios (day and night-time).

3.3 LSS

No changes, follow the standard protocol.

3.4 SAS

Follow the 2023 SAS Assessment protocol, with application of only 2020 items:

- SLIF Requirements NOT to be considered:
  - Local hazards
  - Road features
  - System updates
- Point distribution according to the 2020 Assessment protocol (as per below table)

SPEED LIMIT INFORMATION FUNCTION	**Points**
Basic SLIF (GSR compliant)	0.50
Advanced SLIF	0.50
System Accuracy	0.25
Warning Function	0.25
SLIF TOTAL	**1.50**
SPEED CONTROL FUNCTION	**Points**
Speed Limitation Function *For cars without SLIF* *For cars with SLIF*	 1.25 0.75
ISL and/or intelligent ACC	1.50
SPEED CONTROL FUNCTION TOTAL	**1.50**
SPEED ASSIST SYSTEM TOTAL	**3.00**

Table 3-2 SAS Score summary

3.5 OSM

Follow the 2020 standard protocol (Only the driver and front row outboard passenger seat will be assessed for SBR).