

ANCAP RATING ROAD MAP 2011-2016

Purpose

This document sets out the approved 2011-2016 ANCAP Road Map and provides details to industry and ANCAP stakeholders of what is required under the Road Map year by year. It is an update to the 2011-2015 Roadmap published by ANCAP in February 2011.

Background

Since 1999 ANCAP has tested and rated vehicles using essentially the same protocols as Euro NCAP. This produces a rating out of 5 stars for front occupant (driver and front passenger) protection and a separate rating (originally out of 4 stars) for pedestrian protection.

More than half of the model ratings published by ANCAP in that time have been based on at least one set of crash test results from Euro NCAP. Crash test data from Europe is therefore an important component of ANCAP model coverage.

Euro NCAP also publishes a rating for child occupant protection but this was found to be unsuitable for ANCAP as different child restraints are supplied to the Australian market, when compared with Europe.

This Road Map has been developed in consultation with industry through the Australian Federal Chamber of Automotive Industries (FCAI) and the New Zealand Motor Industry Association (MIA).

Aims of the Road Map

- To promote and reward improvements in vehicle safety beyond that covered by the 2010 ANCAP rating system.
- To implement key priorities of ANCAP members in the field of vehicle safety.
- To provide consumers with information about the availability of safety features and vehicle performance that go beyond regulatory requirements.
- To provide the automotive industry with guidance on future ANCAP requirements to assist with the design and specification of new models.

Changes to Euro NCAP rating system

Early in 2009 Euro NCAP introduced major changes to its rating system. This combined previous ratings and a new "Safety Assist" category into an overall rating out of 5 stars. Euro NCAP no longer publishes separate star ratings for front occupant, pedestrian or child occupant protection but continues to

conduct the tests to the same protocols and continues to provide ANCAP with the test data. It is therefore possible for ANCAP to continue using the previous rating system and still republish results from Europe. There is some risk that on occasion ANCAP ratings might no longer match those by Euro NCAP but this has been the case since 2008 when ANCAP introduced a requirement for ESC as a pre-requisite for a 5-star rating. Several models in Australia have missed out on a 5-star rating due to a lack of ESC.

The Safety Assist component of the new Euro NCAP rating system currently covers three safety features: electronic stability control, speed limitation devices (initially manual systems) and seat belt reminders. Points are assigned to each feature. A minimum Safety Assist score is required for each star rating. For example, in 2009 a minimum Safety Assist score of 60% was required for a 5-star overall rating.

Other NCAP tests

In addition to the offset frontal, mobile barrier side impact and side pole tests, several other types of ratings are conducted by NCAP organisations around the world:

- Pedestrian protection - conducted by Euro NCAP, ANCAP, KNCAP and JNCAP.
- Child occupant protection - conducted by Euro NCAP (vehicle crash tests), and JNCAP (sled tests).
- Rear seat adult occupant protection - conducted by JNCAP from May 2009.
- Whiplash rating - conducted by Euro NCAP, IIHS, NRMA Insurance and KNCAP.
- Rollover propensity (cornering test) - conducted by US NCAP (NHTSA) and KNCAP.
- Roof strength - static strength test conducted by IIHS since March 2009. Dynamic rollover tests are under development in the USA and research will soon commence in Australia.
- Dynamic braking tests - conducted by JNCAP and KNCAP.
- Safety assist (active safety features) - conducted by Euro NCAP since 2009 and proposed by US NCAP.

There are some variations in test and rating protocols amongst these organisations.

NCAP test and rating protocols

Based on NHTSA criteria, for NCAP purposes, a performance test needs to be:

- a) Repeatable and equitable amongst the full range of vehicles that will be subjected to the test;
- b) Discriminating (showing a clear difference between best and worst performers in each class);

- c) Where possible, correlated with the outcomes of real-world crashes/injury outcomes;
- d) Economically feasible (the need for fabrication of a test rig needs to be considered, as well the destruction of test vehicles); and
- e) Credible with the automotive industry and consumers,

The availability of a suitable test protocol that meets these criteria is an important factor in the decision to introduce a new NCAP test.

Changes to ANCAP's Testing Regime

The ANCAP Road Map sets out a new testing regime for the assessment of vehicle safety and the awarding of an ANCAP star rating. Progressively over the life of the Road Map, ANCAP will be introducing new tests, new calculation methods and new safety assist technology ("SAT") requirements.

The offset frontal, side impact, side pole and pedestrian tests will be retained. Adding to the physical test regime will be whiplash tests (based on work currently undertaken by NRMA Insurance¹) and roof crush strength tests (based on work undertaken by IIHS since 2009²).

In relation to SAT, both mandatory and additional SAT will be required, with the requirements generally becoming more stringent each year.

Calculation of the overall ANCAP star rating will be in accordance with Diagram A. All physical crash test results and the SAT elements will be included in the calculation of the overall ANCAP star rating.

Full details of the Road Map's revised star qualifiers can be found in Table 1

The Road Map came into effect on 18 February 2011 and the requirements for 2011 are applied to vehicles rated* after that date. From 2012 onwards, the Road Map requirements for each year will come into force from 1 January of that year. For example, the requirements shown in Table 1 for 2015 are only applicable to new models **first released to the Australian/New Zealand market in 2015**. If a new model was first released in 2015 but is rated* by ANCAP in 2016 then the 2015 criteria will be applied.

* Rated means publication of ANCAP rating.

¹ RCAR-IIWPG Seat/Head Restraint Evaluation Protocol <http://www.rcar.org/Papers/Papers.htm>

² The roof strength rating is based on the single-sided roof crush test of US FMVSS 216 with a rating in accordance with the protocols of the Insurance Institute for Highway Safety: <http://www.iihs.org/ratings/roof/information.html>

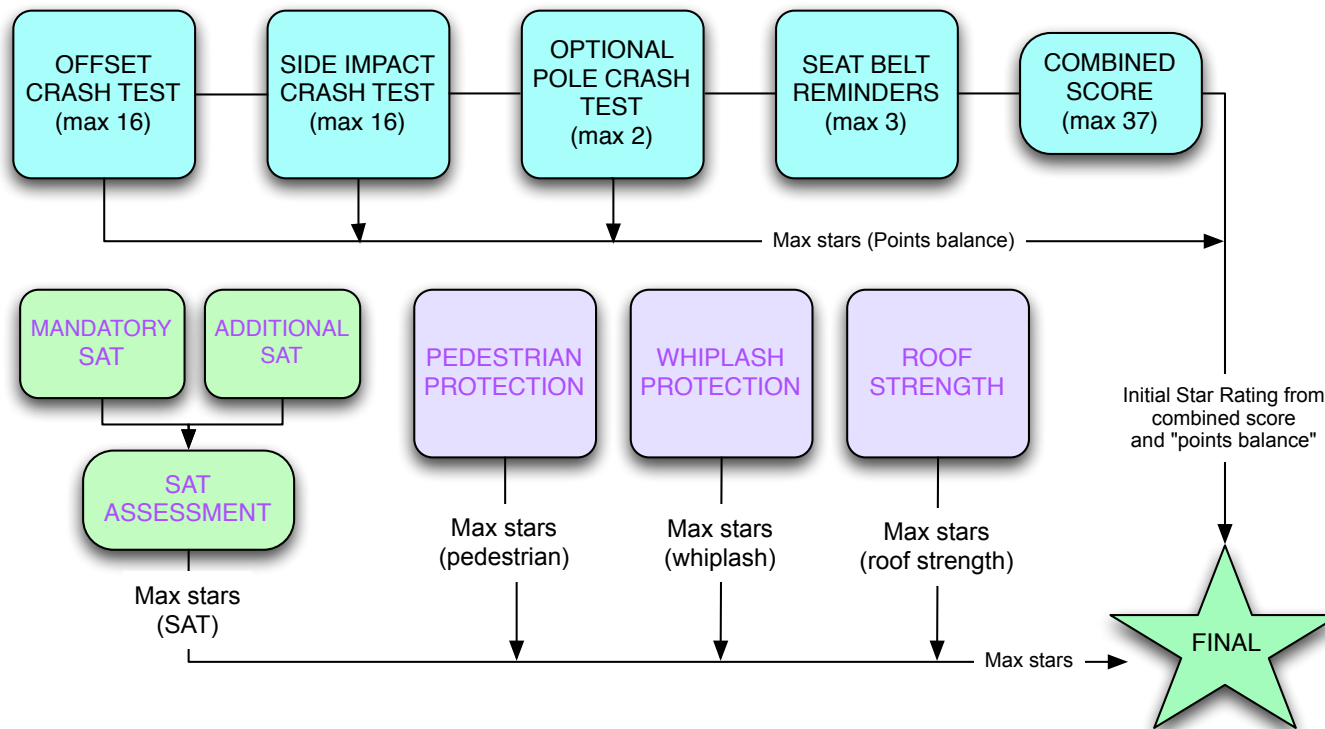


DIAGRAM A – Calculation of ANCAP Rating

New ANCAP Star Qualifiers

--- TABLE 1--- ANCAP ROAD MAP 2011 – 2016									
Year	Minimum Frontal Offset Score	Minimum Side Impact Score	Minimum Side Pole Score	Minimum Combined Score ⁴	Minimum Pedestrian Rating	Minimum Whiplash Rating	Minimum Roof Strength Rating	Mandatory SAT ¹	Minimum Additional SAT ²
Requirements for 5-Star Rating									
2011	12.5	12.5	1	32.5	-	-	-	ESC, 3PSB, HPT front seats	-
2012	12.5	12.5	1	32.5	Marginal ³	Acceptable	-	ESC, 3PSB, HPT front seats	2
2013	12.5	12.5	1	32.5	Marginal ³	Acceptable	-	2012 + SBR front seats, EBA	3
2014	12.5	12.5	1	32.5	Acceptable ³	Good	Marginal	2013 + HPT 2nd row seats	4
2015	12.5	12.5	1	32.5	Acceptable ³	Good	Marginal	2014 + SBR 2nd row fixed seats	5
2016	12.5	12.5	1	32.5	Acceptable ³	Good	Acceptable	"	6
Requirements for 4-Star Rating									
2011	8.5	8.5	-	24.5	-	-	-	-	-
2012	8.5	8.5	-	24.5	-	-	-	ESC	-
2013	8.5	8.5	-	24.5	-	-	-	ESC	1
2014	8.5	8.5	-	24.5	Marginal ³	Acceptable	-	2013 + 3PSB, HPT front seats	2
2015	8.5	8.5	-	24.5	Acceptable ³	Acceptable	-	2014 + SBR front seats, EBA	3
2016	8.5	8.5	-	24.5	Acceptable ³	Good	Marginal	2015 + HPT 2nd row seats	4

Requirements for 3-Star Rating									
2011	4.5	4.5	-	16.5	-	-	-		
2012	4.5	4.5	-	16.5	-	-	-	-	-
2013	4.5	4.5	-	16.5	-	-	-	ESC	-
2014	4.5	4.5	-	16.5	-	-	-	2013 + 3PSB	1
2015	4.5	4.5	-	16.5	-	-	-	"	2
2016	4.5	4.5	-	16.5	Marginal ³	Acceptable	-	2015 + HPT front seats	3
Requirements for 2-Star Rating									
2011	1.5	1.5	-	8.5	-	-	-		
2012	1.5	1.5	-	8.5	-	-	-	-	-
2013	1.5	1.5	-	8.5	-	-	-	-	-
2014	1.5	1.5	-	8.5	-	-	-	ESC	-
2015	1.5	1.5	-	8.5	-	-	-	"	1
2016	1.5	1.5	-	8.5	-	-	-	2015 + 3PSB	2
Requirements for 1-Star Rating									
2011	-	-	-	0.5	-	-	-	-	-
2012	-	-	-	0.5	-	-	-	-	-
2013	-	-	-	0.5	-	-	-	-	-
2014	-	-	-	0.5	-	-	-	-	-
2015	-	-	-	0.5	-	-	-	-	-
2016	-	-	-	0.5	-	-	-	ESC	-

Notes:

1. Must be standard on the variant being assessed.
2. For additional SAT to score the full value, the particular SAT must be fitted by the manufacturer as standard equipment. SAT fitted by the manufacturer but specified as optional (extra equipment only scores half value.
3. Where indicated in the table, vehicles with a seating reference height of 700mm or more may meet one grade less for pedestrian protection (eg "poor" instead of "marginal" and "marginal" instead of "acceptable".)
4. The Combined Score includes up to 3 points for seat belt reminders (1 for driver, 1 for front passenger and 1 for all 2nd row seats - this is separate from the SAT scoring

A description of all SAT is included in the Appendix. Additional SAT may be selected from Appendix Table A1. Items in Appendix Table A2 do not count as Additional SAT.

Table 2 Mandatory SAT

Feature (see appendix for definitions)	Comment
Electronic Stability Control (ESC)	Required by ANCAP for 5-stars since 2008. To be extended to other star ratings
Seat Belt Reminders (SBR) for fixed seating positions	Common on front seats for 5-star vehicles. Proposed that it remains part of the star rating score, as well as a SAT requirement. To be extended to other star ratings and to rear seats
Head-protecting technology - side airbags (HPT)	Required by ANCAP for front seats for 5-stars since 2004 (pole test). To be extended to other star ratings and to rear seats
Emergency Brake Assist (EBA)	Common on most 5-star vehicles
3-point seat belts for all forward facing seats (3PSB)	Common on most 5-star vehicles

Road Map Review

The ANCAP Road Map will be reviewed, updated and extended annually (in June) on a 5 year rolling program basis. The review will be conducted by ANCAP in consultation with the FCAI and the MIA.

An ANCAP form ("SAT Proposal") is available for the purpose of proposing new SAT for inclusion in Appendix A. Any person or organisation may propose SAT to ANCAP. The proposal must include information about likely road safety benefits and the proposed method of assessing the technology, as set out on the form.

Updates will be published on the ANCAP website following each review.

Safety Assist Technology

The ANCAP Road Map includes both mandatory and additional SAT. All SAT are detailed in Appendix A. For a vehicle to achieve a star rating it must meet the appropriate minimum requirements of the physical crash tests and have as standard fitting the minimum mandatory SAT - it must also have the required number of additional SAT. These additional SAT can be selected by the manufacturer/importer from the list of SAT set out in Table A1 of Appendix A.

Note that mandatory SAT must be standard equipment on the tested variant. Additional SAT will be scored at full value if fitted as standard equipment and at half value if fitted as optional equipment.

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APPENDIX A- SAFETY ASSIST TECHNOLOGIES

The **brown text** indicates it has been copied from Euro NCAP sources. **Blue** text is revised from the previous version of the Road Map.

TBA = assessment method to be advised

Table A1. TECHNOLOGIES THAT ARE COUNTED AS SAT

NAME	DESCRIPTION/FUNCTIONAL DEFINITION	ASSESSMENT METHOD
ADAPTIVE CRUISE CONTROL (ACC)	Detects distance and speed of preceding vehicle and maintains appropriate headway. Functional Definition: Adaptive cruise control (ACC) uses forward looking radar techniques to detect vehicles travelling ahead in the same lane to help maintain pre-selected speed and automatically adjust speed in order to maintain proper distance between vehicles. In the case of a vehicle travelling ahead slowing down, the engine or braking system of ACC equipped vehicle will cause it to decelerate.	Compliance with "Functional Definition"
ADAPTIVE FRONT LIGHTING SYSTEMS	Headlights and associated lights that adjust their direction and intensity to provide additional illumination on curves, turns, and hills and to highlight potential hazards. ECE Definition: " Adaptive front lighting system " (or "AFS") means a lighting device type-approved according to Regulation No. 123, providing beams with differing characteristics for automatic adaptation to varying conditions of use of the dipped-beam (passing beam), and, if it applies, the main-beam (driving-beam)	ADR 13 (ECE 48 and ECE 123)
ADDITIONAL OCCUPANT PROTECTION AIRBAGS	Additional airbags that are not associated with the crash tests conducted by ANCAP (e.g. centre console between front seats, rear seat frontal airbag, rear seat thorax side airbags and seat cushion airbags). Each type of airbag system will count as one SAT (if standard). Functional Definition: TBD for each type of airbag	Compliance with "Functional Definition" plus manufacturer's crash test data.
ALCOHOL /DRUG IGNITION INTERLOCK	Require driver to perform and pass a breath alcohol test before the vehicle can be driven Functional Definition: TBD	Compliance with "Functional Definition"
ATTENTION ASSIST (FATIGUE DETECTION)	Attention Assist is a drowsiness detection system that warns drivers to prevent them falling asleep momentarily whilst driving. It will prompt them to take a break before it's too late. The system may judge drowsiness at any time or only if it senses a collision is imminent. Attention Assist systems may monitor a driver's face (eyelids or direction of driver's face) or steering wheel input. If the system sense that the driver's eyes have been closed longer than they would be due to normally blinking, the system regards this as a sign that the driver is inattentive and issues an early warning: either visual, audible or haptic (e.g. vibration or warning brake application). Alternate Attention Assist systems may monitor steering wheel input, pedal movement, speed and/or acceleration.	Based on Euro NCAP Advanced
AUTOMATIC EMERGENCY CALL (eCall)	Alerts emergency services (or a third party service provider) when a severe collision occurs. In the event of a vehicle collision that results in an airbag deployment, an eCall or telematics system automatically alerts emergency services (or third party service provider) that an airbag deployment has occurred. The system transmits location and vehicle identification information so that assistance may be provided.	Based on Euro NCAP Advanced
AUTOMATIC HEADLIGHTS	A headlight control system that automatically switches the headlights on and off according to ambient light levels. Functional Definition: A system in which a photoelectric sensor detects ambient light conditions and automatically activates headlights when lighting levels are low (such as at dawn or dusk). The driver has the	Compliance with "Functional Definition"

NAME	DESCRIPTION/FUNCTIONAL DEFINITION	ASSESSMENT METHOD
	ability to activate or bypass automatic headlight operation with the light switch (or other designated switches / devices.)	
AUTOMATIC HIGH BEAM	Maximises use of the headlamp high beam facility to improve driver vision significantly during night conditions. Functional Definition: Makes use of the forward-looking camera to detect light sources ahead and, in the case of oncoming vehicles, automatically switches the lights to low beam to avoid glare. Additionally, the system will detect red tail lights ahead, even those with lower luminance, to make sure motorists in front are not distracted by high beam lights shining in their rear view mirrors. The high beam is also automatically deactivated in urban areas.	Compliance with "Functional Definition"
AUTONOMOUS EMERGENCY BRAKING	Detects distance and closing speed of objects in path of vehicle and automatically decelerates if driver does not heed warning Many accidents are caused by late braking and/or braking with insufficient force. A driver may brake too late for several reasons: he is distracted or inattentive; visibility is poor, for instance when driving towards a low sun; or a situation may be very difficult to predict because the driver ahead is braking unexpectedly. Most people are not used to dealing with such critical situations and do not apply enough braking force to avoid a crash. Several manufacturers have developed technologies which can help the driver to avoid these kinds of accidents or, at least, to reduce their severity. The systems they have developed can be grouped under the title: Autonomous: the system acts independently of the driver to avoid or mitigate the accident. Emergency: the system will intervene only in a critical situation. Braking: the system tries to avoid the accident by applying the brakes.	Based on Euro NCAP Advanced
BLIND SPOT MONITORING	Detects other vehicles in adjacent lanes in the driver's "blind spot" and alerts driver of their presence. On a motorway, a car which is far behind can be clearly seen in the rear view mirrors. However, as the car approaches, a point is reached where the car cannot be seen in either the interior or exterior mirrors. Typically this occurs when the car is just behind and to one side of the vehicle it is overtaking. It is a common mistake for drivers to change lanes when there is a vehicle in this so-called "blind spot", a manoeuvre which causes many accidents on European motorways. Several manufacturers have developed systems which monitor the blind-spot and help a driver change lanes safely. Some systems are camera-based, others rely on radar. Either way, the area to one side and rearward to the vehicle is monitored and the driver is warned when there is a vehicle in a position where it may not be seen in the rear view mirrors.	Based on Euro NCAP Advanced
DAYTIME RUNNING LIGHTS (DRL)	Dedicated daytime running lights.,	ADR76 (ECE 87) or European Commission Directive 2008/89/EC
DRIVER KNEE AIRBAG	Extra airbags designed to cushion the knees of the driver. Although a knee airbag contributes to the offset crash test score (by reducing upper leg loading and eliminating knee hazards) there are extra benefits that justify inclusion in the SAT list.	Observe after offset crash test
ELECTRONIC BRAKEFORCE DISTRIBUTION (EBD)	Distribution of braking forces is optimised to maximise the available friction Functional Definition: EBD as a subsystem of the ABS system and controls the effective adhesion of the rear wheels to optimise brake system with regard to friction, driving stability and pedal force.	Compliance with "Functional Definition"
ELECTRONIC DATA RECORDER (EDR)	Records critical information in the event of a significant collision. Functional Definition: System that stores vehicle parameters at the time of a crash (airbag deployment) that may help reconstruct the events prior to the crash.	Compliance with "Functional Definition"

NAME	DESCRIPTION/FUNCTIONAL DEFINITION	ASSESSMENT METHOD
ELECTRONIC STABILITY CONTROL (ESC)	Detects if vehicle is nearing the limits of traction during cornering and braking and adjusts braking to individual wheels and engine torque to improve stability.	Current ANCAP requirements or ADR 31/02 or ADR 35/03
EMERGENCY BRAKE ASSIST	Detects emergency brake application. Provides emergency braking assistance and automatically increases the force being applied to the brakes to improve braking performance. Also known as "Brake Assist System" (BAS). Functional Definition: A function of the braking system that deduces an emergency braking event from a characteristic of the driver's brake demand and, under such conditions: (a) Assists the driver to deliver the maximum achievable braking rate; or (b) Is sufficient to cause full cycling of the Anti-lock Braking System.	Compliance with "Functional Definition"
EMERGENCY STOP SIGNAL (ESS)	A signal to indicate to other road users to the rear of the vehicle that a high retardation force has been applied to the vehicle relative to the prevailing road conditions. The emergency stop signal shall be given by the simultaneous operation of all the stop or direction indicator lamps.	ADR 13/00 (ECE 48)
FATIGUE REMINDER	Monitors hours of driving and encourages rest breaks (trip timer) Functional Definition: An alert system that monitors time or distance travelled without rest and provides notice when a preset duration has been exceeded.	Compliance with "Functional Definition"
FOLLOWING DISTANCE WARNING	Detects distance to preceding vehicle and alerts driver if the gap is less than recommended headway for the current speed. Functional Definition: Following Distance Warning (FDW) uses forward-looking radar techniques to detect vehicles travelling ahead in the same lane. If a vehicle travelling ahead slows down a warning (audible, visual or haptic) alerts the driver to decelerate.	Compliance with "Functional Definition"
HEAD RESTRAINTS FOR ALL SEATS	Head restraints with a geometry designed to protect an adult in a collision from the rear	ADR 3/03 (ECE 17)
HILL LAUNCH ASSIST	Using the braking system, HLA is engaged when the car is stationary to prevent it from rolling. Functional Definition: Effective on both uphill and downhill gradients, HLA provides a delay when the driver moves their foot from the brake pedal to the accelerator pedal, as the system maintains pressure to the braking system. The HLA feature avoids the need for the driver to go through an awkward sequence of events involving the parking brake to hold the car momentarily whilst on a hill. Once sufficient engine torque is reached the HLA feature automatically releases the brake system in a controlled manner.	Compliance with "Functional Definition"
INFLATABLE REAR SEAT BELTS	The inflatable sections may be shoulder-only or lap and shoulder. The system supports the head during the crash better than a web only belt. It also provides side impact protection. Only rear seat inflatable seat belts are counted as a SAT, Front seat inflatable seat belts are not considered as these would be assessed through the performance requirements of the offset frontal crash test. Functional Definition: Inflatable seatbelts have tubular inflatable bladders contained within an outer cover. When a crash occurs the bladder inflates with a gas to increase the area of the restraint contacting the occupant and also shortening the length of the restraint to tighten the belt around the occupant, improving the protection.	Compliance with "Functional Definition" plus manufacturer's crash test data.
INTERSECTION COLLISION WARNING	Detects vehicles approaching from the side at intersections. Alerts driver if a collision is possible	Under development
LANE SUPPORT SYSTEMS	Recognises lane markings and alerts driver if the lane boundary is crossed. Lane Support Systems can assist and warn you when you unintentionally leave the road lane or when you change lane without indication. Lane Departure Warning	Based on Euro NCAP Advanced

NAME	DESCRIPTION/FUNCTIONAL DEFINITION	ASSESSMENT METHOD
	<p>Several manufacturers have developed technologies which warn the driver when the car is getting close to a lane marking. Different systems use different warnings: some give an audible signal while others use a vibrating steering wheel to simulate the feeling of the car running over a 'rumble strip'. The intention is simply to make the driver aware that the car is in danger of crossing the line. Some systems need a line only on one side of the vehicle while other systems rely on having a distinct marking on either side.</p> <p>Lane departure warning systems rely on distinct lane markings: their effectiveness is reduced if lines cannot be clearly distinguished such as in heavy rain or fog, or if the road markings are obscured by mud or snow. In such cases, an indication is given to the driver that the system is unable to assist'.</p> <p>Lane Keep Assist</p> <p>Lane-Keep Assist systems address similar accident situations to lane departure warning. However, whereas warning systems rely on the driver to take corrective action, Lane Keep Assist also proactively steers the car back into the lane. When the car is close to a marking, the system gently steers the car away from the line until it is safely within the lane. The system can steer the car either by applying gentle braking to one wheel or, in the case of electric steering systems, by applying a direct steering input.</p>	
NIGHT VISION ENHANCEMENT	Generally uses technology (e.g. infra-red) to enhance driver vision	TBA
PRE-CRASH SYSTEMS	<p>Detects imminent collision. Deploys safety devices such as seat belt pretensioners.</p> <p>Manufacturers take care to ensure that their safety systems are effective for occupants of different sizes and for those sitting in different positions. However, the very best levels of protection can be achieved when the interaction between occupant and restraint systems is optimised. Several manufacturers have developed systems designed to allow a vehicle's protection systems to operate most effectively during an impact.</p> <p>Some of these systems react immediately following or during the impact to optimise occupant safety. For example, they may not directly restrain the occupant but may control the occupant's movement so that the restraint systems work most effectively. Other systems may predict when an accident is about to happen and in a split second prepare the vehicle and its occupants for the collision. Predicting the accident can be done in a number of ways: vehicle dynamics and driver actions can be monitored for panic reactions, or radar sensors can detect obstacles in front of the car. The actions which the systems take can also vary but, typically, slack will be removed from seatbelts, seating positions may be quickly adjusted to optimise airbag performance and windows shut to prevent ejection. In such cases, the actions taken are reversible in the event that the accident is avoided.</p>	Based on Euro NCAP Advanced
REVERSING COLLISION AVOIDANCE	<p>Visual aids (e.g. camera) to improve the rearward field of view plus sensors detect objects in the path of a reversing vehicle. Parking sensors alone would not meet the requirements.</p> <p>Functional Definition: Visual aid that may be supplemented with sensors.</p>	Compliance with "Functional Definition"
ROLL STABILITY SYSTEM	<p>Detects imminent rollover and initiates corrective (avoidance) action.</p> <p>Functional Definition: An enhanced Electronic Stability Control ESC system which has both directional control and roll-over control. Roll-over control means a function within the ESC system that reacts to an impending roll-over in order to stabilise the vehicle. It acts by constantly monitoring the vehicle's behaviour and inducing additional understeer into the vehicle when it detects an increased propensity of rollover during extreme handling manoeuvres. As part of the control actions, it brakes individual wheels and reduces the driving torque to reduce the risk of a rollover as well as reduce vehicle speed for greater stability.</p>	Compliance with "Functional Definition"

NAME	DESCRIPTION/FUNCTIONAL DEFINITION	ASSESSMENT METHOD
ROLLOVER OCCUPANT PROTECTION SYSTEMS	Detects a rollover situation and deploys occupant protection systems such as inflatable curtains. Rollover-enabled air bags are designed to stay inflated after a crash for about five seconds vs. the 300 milliseconds of protection provided by head-curtain air bags that deploy in a side-impact collision. Functional Definition: A rollover sensor deploys side curtain airbags to help protect occupants in rollover events. The curtains are triggered by a rollover sensor, independently of the driver and front passenger airbags. The curtains are designed to stay inflated longer for added protection in a rollover.	Compliance with "Functional Definition" plus manufacturer's crash test data.
ROLLOVER WARNING	Alert drivers when the lateral forces or vehicle dynamics indicate a risk of rollover. Functional Definition: TBD	Compliance with "Functional Definition"
SEAT BELT INTERLOCK	Require driver to put on seat belt before the vehicle can be driven	Interlock: TBA
SEAT BELT REMINDER	Provides alert to driver that seated occupants do not have seat belts connected	Euro NCAP protocol
SIDE AIRBAGS WITH HEAD PROTECTION	Side airbag or curtain airbag deploys in side impact and protects the head	Extra observation after a pole test using geometric assessment 1(e.g. whether a rear-seat occupant would have had head protection)
SMART KEY	Vehicle will not operate without an appropriate electronic key. This might have speed or time-of-day restrictions. Functional Definition: TBD	Compliance with "Functional Definition"
SPEED ALARM (MANUAL)	Alert drivers when the vehicle speed exceeds a pre-set limit Functional Definition: Driver selects a speed for an alert. Note that the inclusion of this SAT will be reviewed once ISA systems become established. (see next item)	Compliance with "Functional Definition"
SPEED ALERT SYSTEMS (ISA)	Determines current speed limit and alerts driver if the limit is being exceeded (passive ISA) or limits the speed of the vehicle (active ISA). Excessive speed is a factor in the causation and severity of many road accidents. Speed restrictions are intended to promote safe use of the road network by keeping traffic speeds below the maximum that is appropriate for a given traffic environment, thereby protecting vehicle occupants and other road users. Greater adherence to speed limits would avert many accidents and reduce the severity of those that occur. Excessive speeding is sometimes unintentional. Drivers who are tired or otherwise distracted may allow their speeds to drift above the maximum allowed for that road. Others may inadvertently miss a traffic sign alerting them to a change in the speed limit, such as when entering a built-up area. Speed alert or Intelligent Speed Assistance (ISA) systems help drivers to keep their speeds within the recommended limits. Some systems display the current limit so that the driver is always aware of the maximum speed allowed on that road. The speed limit may, for example, be determined by software which analyses images from a camera and recognises traffic signs. Alternatively, satellite navigation is becoming increasingly accurate and could be used to provide information to the driver. However, this relies on the most up to date digital maps being available at all times. Systems may or may not issue a warning to the driver when the speed limit is being exceeded and current systems are voluntary: they can be switched off and they rely on the driver responding appropriately to the warning.	Based on Euro NCAP Advanced Australian protocol also under development.
SPEEDOMETER SCALE AND DISPLAY	Speedometer maximum speed and scale match Australian maximum speed limits (e.g. 130km/h maximum)	Functional definition - see Top Speed Limiter
THREE-POINT SEAT BELTS FOR ALL SEATS	Lap/sash seat belts in all forward facing seating positions (where not a mandatory SAT)	Vehicle inspection

NAME	DESCRIPTION/FUNCTIONAL DEFINITION	ASSESSMENT METHOD
TOP SPEED LIMITER	<p>Vehicle is incapable of traveling above a set speed for prolonged periods. The top speed setting must be no more than 120km/h. A coded override (eg PIN) could be allowed for each trip.</p> <p>It is preferred that the system also limits the top speed in reverse to 10km/h</p> <p>A top speed limiter would discourage theft and car-jacking</p> <p>Functional Definition: Adjustable Speed Limitation Devices (ASLD) based on ECE 89 (already assessed by Euro NCAP)</p>	Compliance with "Functional Definition"
TRAFFIC SIGN RECOGNITION	Optical recognition of traffic signs for assisting driver	TBA
TRAILER STABILITY CONTROL	<p>The trailer stability control system ensures superior stability and safety when towing. With increasing speed, trailers tend to swing from side to side, and may even swing out of control. This is especially the case for heavier trailer loads or if the weight of the trailer load is not distributed evenly: even at relatively low speeds, a swaying motion can arise. This can destabilise both the trailer and the towing vehicle unless a stabilising measure quickly intervenes.</p> <p>Functional Definition: The trailer stability control system recognizes the early signs of this dangerous swinging motion. It activates the brakes immediately to slow the trailer down and return stability. It discerns this danger by constantly monitoring the rotation movement of the vehicle using special sensors. If these values exceed the safe limit, trailer stability control activates the brakes and simultaneously, the engine output is reduced. The resulting drop in speed brings the trailer back to stability. As soon as stability is restored, the driver is again in full control of the vehicle's speed.</p>	Compliance with "Functional Definition"
TYRE PRESSURE MONITORING	Detects when a tyre drops below designated pressure and alerts driver	US FMVSS 138 or ECE 64 (other standards may be accepted)
VEHICLE TO VEHICLE AND VEHICLE TO INFRASTRUCTURE COMMUNICATIONS	Use of wireless technologies to enhance safety through communication between Vehicles and Infrastructure (I2V & V2I) and between Vehicles (V2V). Infrastructure-based warning systems and inter-vehicle warning systems may alert drivers to upcoming hazards, accidents, approaching emergency vehicles, bypass routes, traffic lights etc..	TBA
WORKLOAD MANAGER	Filters and prioritises the information made available to the driver. Postpones or cancels certain distractions, such as non-urgent vehicle warnings or integrated mobile telephone calls.	TBA

Table A2. TECHNOLOGIES THAT ARE NOT COUNTED AS SAT

NAME	DESCRIPTION	COMMENT
ABS BRAKES	Prevents individual wheels from lock up during heavy braking (or on slippery surfaces) and subsequently assists driver to maintain control	Already part of ESC
ACTIVE HEAD RESTRAINTS	Seat design responds to rearward collision by moving head restraint forward and other actions that reduce the risk of whiplash type injuries. Electronic detection of collision may offer better protection, compared with mechanical systems.	Superseded by dynamic whiplash tests.
BONNET FOR PEDESTRIAN PROTECTION	Detects collision with pedestrian and either deploys external airbag or raises bonnet to lessen impact	Now part of Euro NCAP pedestrian protection assessment.
NAVIGATION SYSTEM (GPS)	Displays dynamic map of roads. Some give voice instructions for route following. Some give known hazard warnings such as blackspots.	Speed limit alerts already covered by ISA. No other major safety benefits.
PARKING ASSIST SYSTEMS	Automated reverse park system	Primarily to reduce risk of property damage.
OFF-ROAD ASSIST SYSTEMS	Features designed to assist off-road driving such as hill-descent control	Primarily for off-road use
TRACTION CONTROL	System detects potential wheel spin due to excessive driving torque and limits this torque.	Already part of ESC

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