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Rating Scheme 2013-2017


- **Rating Scheme from 2013 to 2017**
 - What, When, How?
- **Status of Road Map Implementation**
 - Delivery of Test and Assessment Protocols
- **Proposed rating scheme**
 - Ref: Euro NCAP Rating Review – April 2012
- **Consultation phase**
 - March 6 meeting with car industry
 - April 19 meeting with car & supplier industry
- **Final decision**
 - Board meeting of 12 June 2012

2


Development

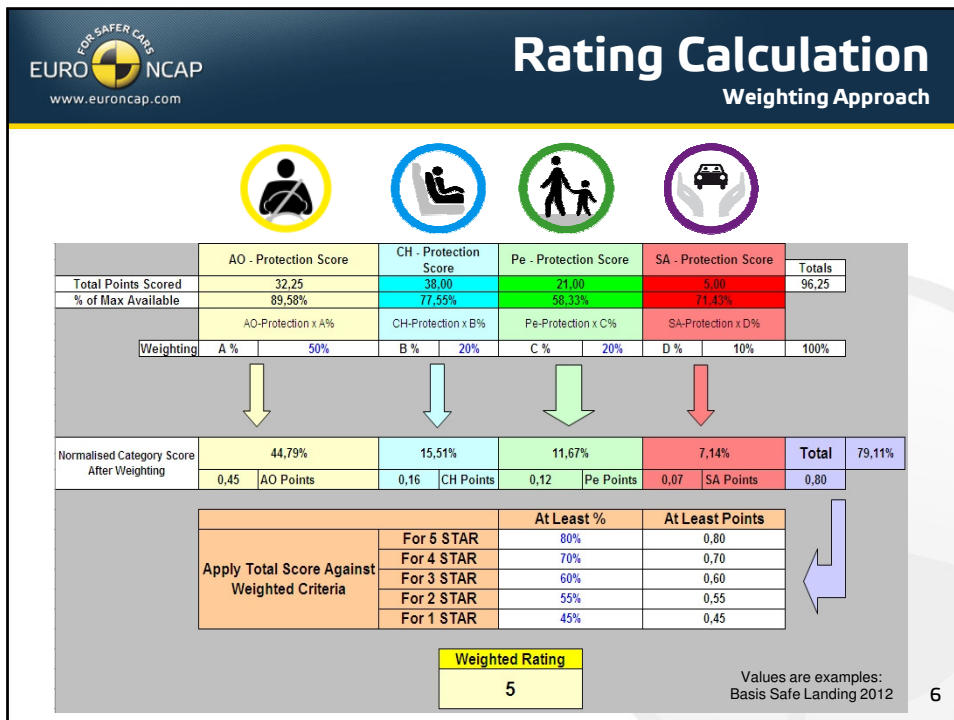
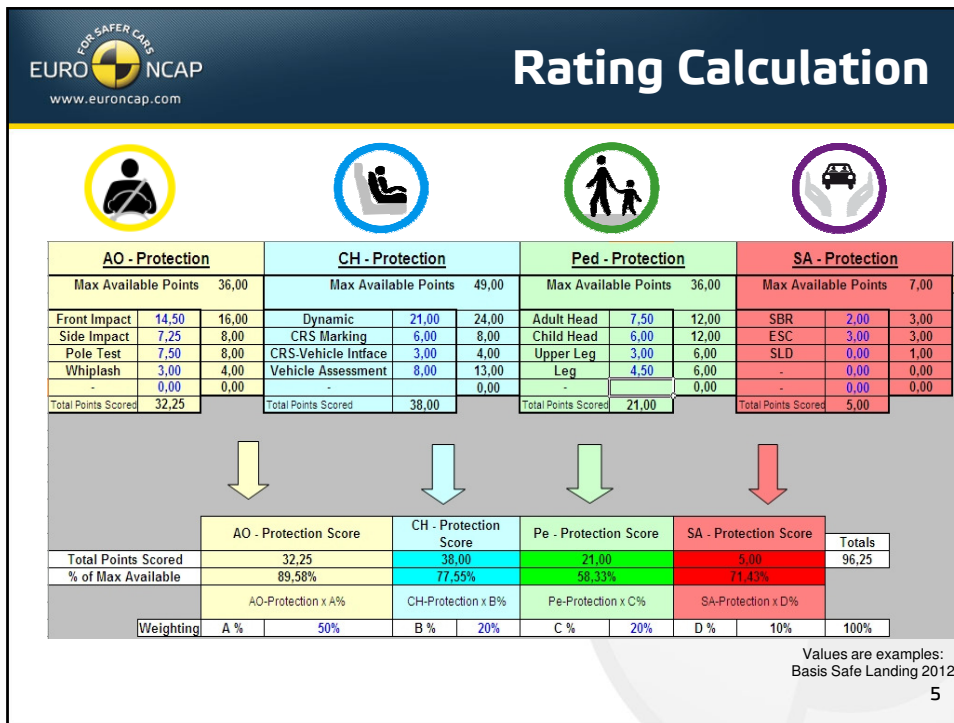
- **Introduction Overall Rating in 2009**
 - 4 Boxes, Weighing and Balancing
- **Soft Landing Phase 2009-2012 (4 yrs)**
 - Escalating Balance Thresholds
 - Also Fitment Requirement from 85% to 100% (EU-27)
- **1st Phase 2013-2016 (4 yrs)**
 - Implementation of Roadmap Items
 - Review of Weighing, Balancing and Thresholds
- **2nd Phase 2017+**
 - Refinement and/or escalating Thresholds of some new Roadmap Items

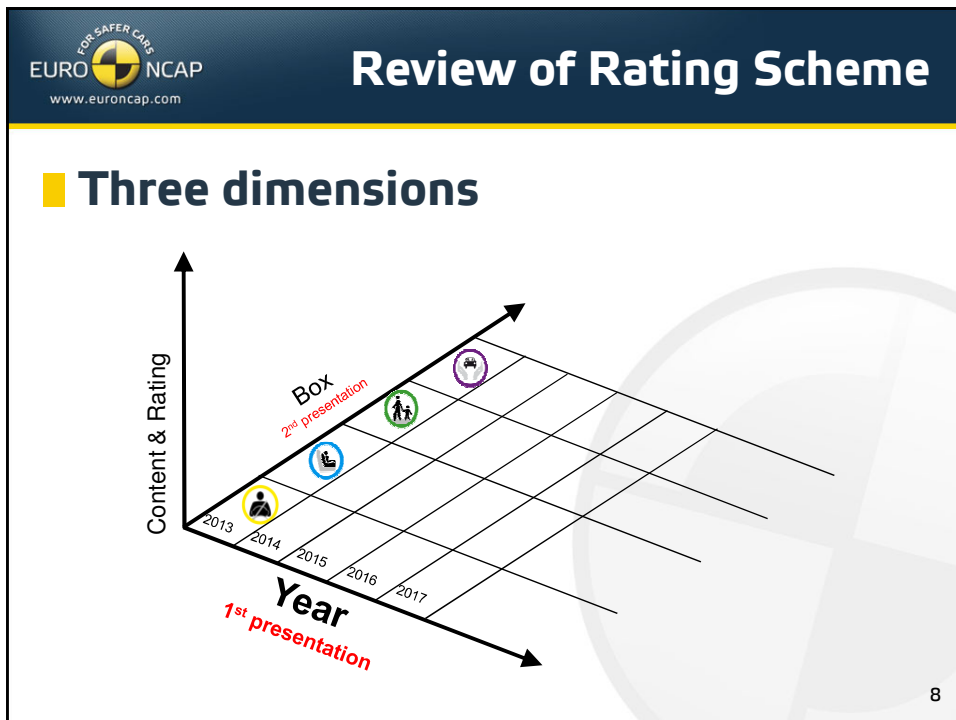
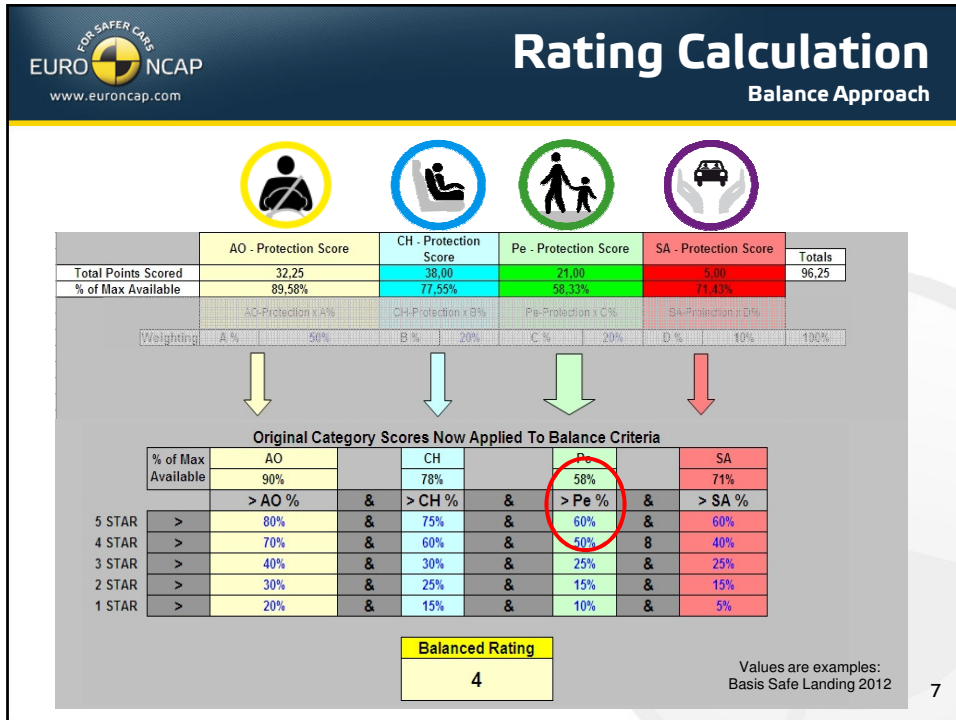
3


Principles

- **All equipment in Boxes 1-3 must be Standard**
 - Box 4 may require escalating fitment requirements
- **No Passive & Active Safety trade-off**
 - Initially 5 stars achievable by Passive Safety only (for Box 1-3)
- **The Rating Scheme should remain**
 - Plausible, reliable, fair, challenging but feasible to car manufacturers
 - Allowing cars in all classes (from a technical point of view) to be able to achieve 5 stars
 - Understandable to consumers

4





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Review of Rating Scheme

Current Rating Scheme (2012)

Rating Scheme Thresholds %						Introduction	Thresholds in Points				
2012	Icon 1	Icon 2	Icon 3	Icon 4	Total	2012	2012	Icon 1	Icon 2	Icon 3	Icon 4
★★★★★	80	75	60	60	80	73	★★★★★	28,8	36,75	21,6	4,2
★★★★☆	70	60	50	40	70	61	★★★★☆	25,2	29,4	18	2,8
★★★☆☆	40	30	25	25	60	34	★★★☆☆	14,4	14,7	9	1,75
★★☆☆☆	30	25	15	15	55	25	★★☆☆☆	10,8	12,25	5,4	1,05
★☆☆☆☆	20	15	10	5	45	16	★☆☆☆☆	7,2	7,35	3,6	0,35
Weight	50	20	20	10			Max points	36	49	36	7

Weighting Factor for each Box

Weighting Threshold

Balancing Threshold

Total, based on minimum scoring in Balancing

9

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Rating Scheme 2013

Planned refinements and extensions

Rating Scheme Thresholds %						Introduction	Thresholds in Points					
2013	Icon 1	Icon 2	Icon 3	Icon 4	Total	2013	2013	Icon 1	Icon 2	Icon 3	Icon 4	
★★★★★	80	60	60	65	80	71	SAS (+2 pt. Box 4)	★★★★★	28,8	29,4	21,6	5,85
★★★★☆	70	60	50	55	70	63	COP (vehicle based & Q-dummies)	★★★★☆	25,2	29,4	18	4,95
★★★☆☆	40	30	25	30	60	34	5 star level exemption for COP Grid	★★★☆☆	14,4	14,7	9	2,7
★★☆☆☆	30	25	15	20	55	25	Update rounding scheme	★★☆☆☆	10,8	12,25	5,4	1,8
★☆☆☆☆	20	15	10	10	45	16		★☆☆☆☆	7,2	7,35	3,6	0,9
Weight	50	20	20	10			Max points	36	49	36	9	

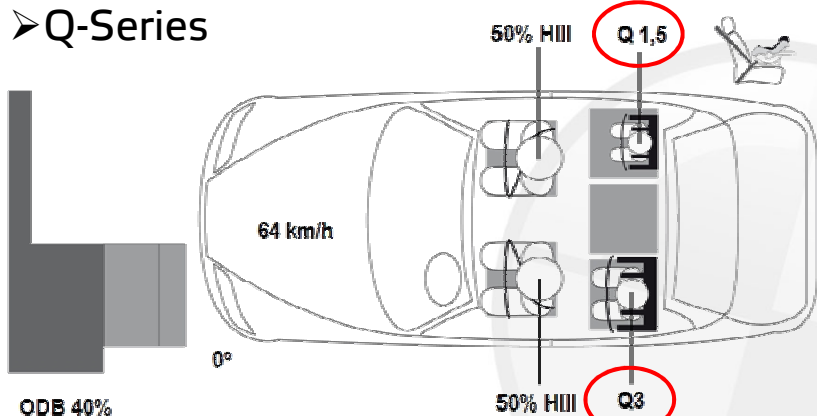
SAS: Speed Assist System like Speed Limitation Device (SLD) and Intelligent Speed Assistance (ISA); see Safety Assist slides
 COP: Child Occupant Protection; see next slides
 Grid: see next slides
 Rounding: see next slides

10


Rating Scheme 2013


Child Occupant Protection

➤ Q-Series




QDB 40%
 Speed: 64 km/h ± 1 km/h / Overlap 40% ± 20 mm / Vertical Alignment ± 25 mm

11


Rating Scheme 2013


Child Occupant Protection

➤ CRS – Vehicle Compatibility



Independently rated CRS (universal & semi-universal)
 VM instructions in the handbook
 Checklist of common incompatibilities
 Consumer recommendations

12




Rating Scheme 2013

■ Pedestrian Protection


- Predefined "grid" replaces worse case point selection
- OEM assigns colors of nodes

Green	HIC < 650
Yellow	650 < HIC < 1000
Orange	1000 < HIC < 1350
Brown	1350 < HIC < 1700
Red	1700 < HIC


- Selected points are tested to verify assignment – test variability
- All points included in score

13


Rating Scheme 2013

■ Extension of SLD protocol: Speed Assist Systems (SAS)





```

    graph LR
      Driver[Driver] --> SpeedSetting[Speed Setting]
      ISA[ISA] --> SpeedSetting
      SpeedSetting --> Warning[Warning]
      Warning --> SpeedLimitation[Speed Limitation]
  
```

- Visual and complementary warnings
- Manually setting the speed, setting speed using ISA
- Accuracy, coverage & reliability, status & loss of signal, visual requirements, default settings, responsiveness


14


Rating Scheme 2013

■ Intelligent Speed Assistance



➤ Final scoring scheme:

	SLIF	MSA	ISA
Communicating speed limit	1.5		1.5
Camera based	0.5		0.5
Digital Map based	0.5		0.5
Camera and Digital Map based	1.5		1.5
Warning		1	2
Driving Support (limitation)		1	1
Max score available	1.5	2	4.5


Raw score scaled to max. 3 points in SA

➤ Test protocol by October 2012

15


Rating Scheme 2013

■ Updated Rounding Scheme (2013)

➤ Current System (mathematical rounding):

- 2.4 → 2
- 2.5 → 3

➤ New System (integer rounding):

- 2.4 → 2
- 2.5 → 2
- 2.9 → 2
- 3.0 → 3

16

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Rating Scheme 2014

“The Year of Active Safety”

Rating Scheme Thresholds %						Introduction		Thresholds in Points				
2014					Total	2014		2014				
★★★★★	80	75	60	65	75	72	AEB City (3 pt. Box 1)	★★★★★	30,4	36,75	21,6	8,45
★★★★☆	70	60	50	55	65	61	Flex-PLI	★★★★☆	26,6	29,4	18	7,15
★★★☆☆	50	30	40	30	50	40	AEB Inter-Urban (3 pt. Box 4)	★★★☆☆	19	14,7	14,4	3,9
★★☆☆☆	30	25	20	20	40	25	LDW/LKD (1 pt. Box 4)	★★☆☆☆	11,4	12,25	7,2	2,6
★☆☆☆☆	20	15	10	10	30	15	Dynamic Handling	★☆☆☆☆	7,6	7,35	3,6	1,3
Weight	40	20	20	20			Weighting	Max points	38	49	36	13

AEB City: Advanced Emergency Brake Systems < 50km/h
 Flex-PLI: Flexible Pedestrian Leg Form Impactor
 AEB Inter-Urban: Advanced Emergency Brake Systems > 40km/h
 LDW/LKD: Lane Departure Warning / Lane Keeping Device
 Dynamic Handling (DH): Test for ESC / ESP

see next slides

17

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Rating Scheme 2014

Advanced Emergency Brake Systems










Bild: 4active




18


Rating Scheme 2014

Test Procedures for AEB

AEB City:

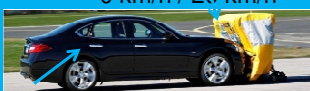
0 km/h



10 – 50 km/h

AEB Inter-Urban:

0 km/h / 20 km/h



30 – 80 km/h


Testing from 2014

Procedure and tools well defined

Testing from 2016

AEB Pedestrian:


Proposals from vFSS and AEB/RCAR under discussion





10 – 60 km/h

Procedure and tools under discussion

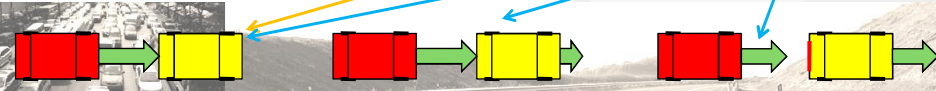
19



Rating Scheme 2014

AEB Car-to-car scenarios (Status March 2012)

 Box 1
 Box 4


Car-to-car scenarios as of March 2012 PNCAP		AEB City	AEB Inter-Urban		
		Lead vehicle stopped	Lead vehicle stopped	Lead vehicle moving	Lead vehicle decelerating
Target	Initial speed [km/h]	0	0	20	50
	Deceleration [m/s ²]	0	0	0	2 and 6
	Following Distance [m]	not relevant	not relevant	not relevant	12 and 40
Subject Vehicle	Minimum Speed [km/h]	10	30	50	50
	Maximum Speed [km/h]	50	80	80	50
	Increments [km/h]	10 and 5 (for non-avoidance)	t.b.d.	t.b.d.	t.b.d.








Rating Scheme 2014

■ Test Tools


- Target Object and Propulsion system
 - Single well-defined target object will be used in all labs
 - Based upon ADAC target object
 - Final version expected this summer




- Propulsion system and specifications for accuracy (including the use of steering robot) under discussion

21


Rating Scheme 2014

■ ESC & Dynamic Handling


ESC fitment requirements only

2009-2010

Fitment + ECE R13H test pass/fail

2011

Fitment ECE R13H test pass/fail


2012-2013
(unchanged from 2011)

Multiple test scenarios


2014

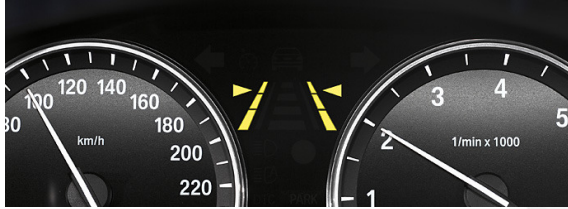
- **2011 until 2013:**
 - ECE R13H pass or fail test
- **2014:**
 - Dynamic Handling (DH) is on hold!

22


Rating Scheme 2014


- Lane Departure and Lane Keep
- Promoting fitment
 - Published technical requirements (NHTSA, ISO, Japan Technical Standard)
 - OEM provides evidence of compliance







Considering real-world based performance test in beyond 2016

23

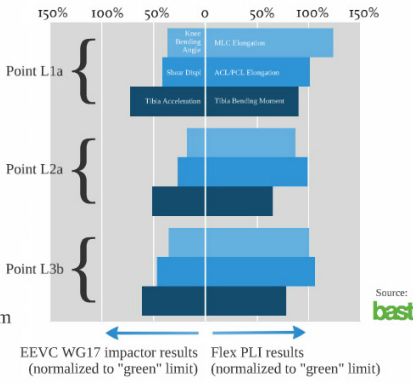

Rating Scheme 2014

- Pedestrian Protection
 - Flex PLI introduction






L1a – Towing eye position
 L2a – Most possible bending
 L3b – Outermost point of bumper beam



EEVC WG17 impactor results (normalized to "green" limit) Flex PLI results (normalized to "green" limit)



Source: bast

24

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Rating Scheme 2015

Update of Crash Methods

Rating Scheme Thresholds %						Introduction		Thresholds in Points						
2015					Total	2015		2015						
★★★★★	80	75	65	70	75	74	Frontal Impact Update	★★★★★	30,4	36,75	23,4	9,1		
★★★★☆	70	60	50	60	65	62	Side Impact Update	★★★★☆	26,6	29,4	18	7,8		
★★★☆☆	50	30	40	40	50	42	COP (dynamic)	★★★☆☆	19	14,7	14,4	5,2		
★★☆☆☆	30	25	20	20	40	25	65 % to be confirmed in 2013	★★☆☆☆	11,4	12,25	7,2	2,6		
★☆☆☆☆	20	15	10	10	30	15		★☆☆☆☆	7,6	7,35	3,6	1,3		
Weight	40	20	20	20				Max points	38	49	36	13		

Front Impact Update:
Side Impact Update:
COP (dynamic): } see next slides

This threshold percentage increase for Pedestrian Safety, however, will need to be confirmed by Euro NCAP in 2013 when more details about the planned protocol changes and their respective impact will be available.

25

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Rating Scheme 2015

ODB Frontal Impact

Speed: 64 km/h ± 1 km/h / Overlap 40% ± 20mm / Vertical Alignment ± 25mm

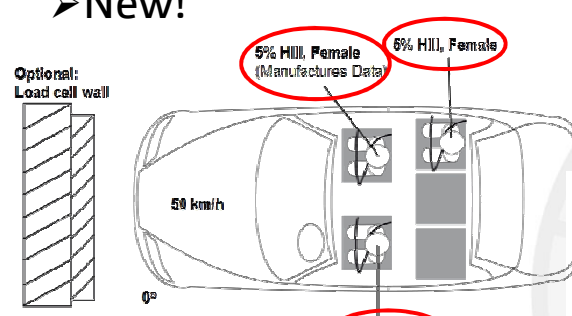
- Q10+
 - 36 channels
 - Calibration: head, neck, chest, shoulder, spine, abdomen, pelvis
- Q6
 - 51 channels
 - Calibration: head, neck, chest, shoulder, spine, abdomen, pelvis

26


Rating Scheme 2015

■ Full-width Frontal Impact

➤ New!



Optional:
 Load cell wall


50 km/h
 0°

5% HIL, Female (Manufactures Data)
 6% HIL, Female
 5% HIL, Female

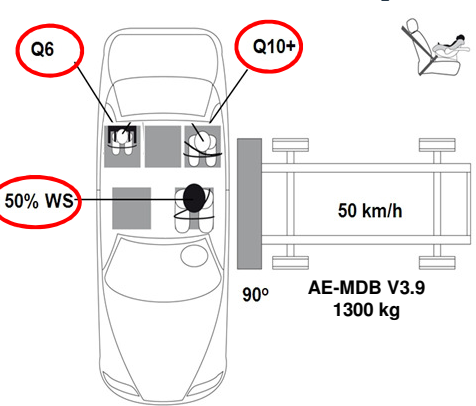
Full-width barrier (100%)
 with crushable face (?)
 Speed: 50 km/h \pm 1 km/h / Overlap 100%

- H35 (female 5th %ile)
- 51 channels
- Calibration: head, neck, chest, spine, femur and tibia

27


Rating Scheme 2015

■ Side Barrier Impact



90° AE-MDB V3.9
 1300 kg

50 km/h

Q6
 Q10+
 50% WS

Speed: 50 km/h \pm 1 km/h / Alignment with R-Point \pm 25 mm
 / Vertical Alignment \pm 25 mm
 50% World SID with F60 seating procedure

- W550 (male 50th %ile)
- 64 channels
- Calibration: head, neck, shoulder, ribs, abdomen, spine, pelvis
- Q10+
- 36 channels
- Calibration: head, neck, chest, shoulder, spine, abdomen, pelvis
- Q6
- 51 channels
- Calibration: head, neck, chest, shoulder, spine, abdomen, pelvis

28

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Rating Scheme 2015

Side Pole Impact

Speed: 32 km/h \pm 1 km/h
50% World SID with F60 seating procedure

Speed: 29 km/h \pm 0,5 km/h
Horizontal Accuracy \pm 38 mm
Angle 90 \pm 3

- WS50 (male 50th %ile)
- 64 channels
- Calibration: head, neck, shoulder, ribs, abdomen, spine, pelvis

29

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Rating Scheme 2015

Pedestrian Protection

➤ BLE update?

➔

Proposal by JAMA

ACEA support is critical


Ongoing Research
Review of BLE Test

Modified Bumper Leading Edge Reference Line
Upper Bumper Reference Line
Modified Bumper Leading Edge Height (BLEH)

JAMA


- Modified Leading Edge Reference line based on WAD 900 line and Upper Bumper Reference line
- Femur or Pelvis impact & criteria depending on BLEH
- Velocity and impact angle dependent on geometry
- Pelvis mass = 11.1 kg, Femur 7.5 kg

30



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Rating Scheme 2016




■ AEB Pedestrian

➤ VRU Detection technology

Rating Scheme Thresholds %						Introduction		Thresholds in Points					
2016					Total	2016		2016					
★★★★★	80	75	65	70	75	AEB Pedestrian (6 pt. Box 3)		★★★★★	30,4	36,75	27,3	9,1	
★★★★☆	70	60	55	60	65	65 % to be confirmed in 2013		★★★★☆	26,6	29,4	23,1	7,8	
★★★☆☆	50	30	40	40	50			★★★☆☆	19	14,7	16,8	5,2	
★★☆☆☆	30	25	20	20	40			★★☆☆☆	11,4	12,25	8,4	2,6	
★☆☆☆☆	20	15	10	10	30			★☆☆☆☆	7,6	7,35	4,2	1,3	
Weight	40	20	20	20				Max points	38	49	42	13	


This threshold percentage increase for Pedestrian Safety, however, will need to be confirmed by Euro NCAP in 2013 when more details about the planned protocol changes and their respective impact will be available.

31




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Rating Scheme 2016




■ AEB Pedestrian Test Scenarios

Phase 1 (2016)




Pedestrian unobstructed




Pedestrian obstructed

Later / t.b.d.



Walking along



Turning

32

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Rating Scheme 2016

Parameter Dependencies

Scenario definition is difficult:
One parameter is always dependent on the other four.

33

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Outlook Future Rating 2017+

LDW/LKD Performance Test

Rating Scheme Thresholds %						Introduction		Thresholds in Points					
2017					Total	2017		2017					
★★★★★	80	75	65	70	75	65 % to be confirmed in 2013		★★★★★	30,4	36,75	27,3	9,8	
★★★★☆	70	60	55	60	65			★★★★☆	26,6	29,4	23,1	8,4	
★★★☆☆	50	30	40	40	50			★★★☆☆	19	14,7	16,8	5,6	
★★☆☆☆	30	25	20	20	40			★★☆☆☆	11,4	12,25	8,4	2,8	
★☆☆☆☆	20	15	10	10	30			★☆☆☆☆	7,6	7,35	4,2	1,4	
Weight	40	20	20	20				Max points	38	49	42	14	

This threshold percentage increase for Pedestrian Safety, however, will need to be confirmed by Euro NCAP in 2013 when more details about the planned protocol changes and their respective impact will be available.

34

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Review of Rating Scheme

Three dimensions

35

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AOP Summary

Adult Occupant Protection


	Score	2012		2013		2014		2015		2016		2017	
Frontal ODB	16	16	44,4%	16	44,4%	16	42,1%	8	21,1%	8	21,1%	8	21,1%
Frontal FW								8	21,1%	8	21,1%	8	21,1%
Side barrier	8	8	22,2%	8	22,2%	8	21,1%	8	21,1%	8	21,1%	8	21,1%
Side pole	8	8	22,2%	8	22,2%	8	21,1%	8	21,1%	8	21,1%	8	21,1%
Whiplash front	2	4	11,1%	4	11,1%	2	5,3%	2	5,3%	2	5,3%	2	5,3%
Whiplash rear	1					1	2,6%	1	2,8%	1	2,8%	1	2,8%
AEB (City)	3					3	7,9%	3	7,9%	3	7,9%	3	7,9%
Total		36	100,0%	36	100,0%	38	100,0%	38	100,0%	38	100,0%	38	100,0%
5-star threshold		28,8	80%	28,8	80%	30,4	80%	30,4	80%	30,4	80%	30,4	80%
Fitment requirements AEB City							100,0%		100,0%		100,0%		100,0%

- Prerequisite 1.5 points for Whiplash to be eligible for 3 points AEB
- Rear whiplash procedure is static only

36


COP Summary


■ Child Occupant Protection




	Score	2012		2013		2014		2015		2016		2017	
Dynamic performance	24	24	49,0%	24	49,0%	24	49,0%	24	49,0%	24	49,0%	24	49,0%
CRS Installation	12			12	24,5%	12	24,5%	12	24,5%	12	24,5%	12	24,5%
Vehicle based assessment	13	25	51,0%	13	26,5%	13	26,5%	13	26,5%	13	26,5%	13	26,5%
Total		49	100,0%	49	100,0%	49	100,0%	49	100,0%	49	100,0%	49	100,0%
5-star threshold		36,75	75%	29,4	60%	36,75	75%	36,75	75%	36,75	75%	36,75	75%

- Exemption for 5 stars in 2013 for cars unable to meet 2013+ requirements

37



COP Summary

■ Updates in steps...



	2012	2013	2014	2015
Load cases	ODB MDB/ECE			ODB MDB/AE-MDB
Vehicle based assessment	CRS Marking & interface	CRS installation check using top pick list		
Dynamic performance Dummies	P18m, P3	Q18m, Q3		Q6, Q10
Dynamic performance Criteria	Kinematic			Dynamic


38



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PP Summary

■ Pedestrian Protection




Euro NCAP Advance Award
for AEB-Pedestrian

	Score	2012		2013		2014		2015		2016		2017	
Headform	24	24	66,7%	24	66,7%	24	66,7%	24	66,7%	24	57,1%	24	57,1%
Upper Legform	6	6	16,7%	6	16,7%	6	16,7%	6	16,7%	6	14,3%	6	14,3%
Lower Legform	6	6	16,7%	6	16,7%	6	16,7%	6	16,7%	6	14,3%	6	14,3%
AEB (Pedestrian)	6									6	14,3%	6	14,3%
Total		36	100,0%	36	100,0%	36	100,0%	36	100,0%	42	100,0%	42	100,0%
5-star threshold		21,6	60%	21,6	60%	21,6	60%	23,4	65%	27,3	65%	27,3	65%
Min requirement Passive for incl AEB										23,1	55%	23,1	55%
Fitment requirements AEB Pedestrian										100%		100%	

This threshold percentage increase for Pedestrian Safety, however, will need to be confirmed by Euro NCAP in 2013 when more details about the planned protocol changes and their respective impact will be available.


39



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SA Summary

■ Safety Assist



	Score	2012		2013		2014		2015		2016		2017	
SBR	3	3	42,9%	3	33,3%	3	23,1%	3	23,1%	3	23,1%	3	21,4%
SAS	3	1	14,3%	3	33,3%	3	23,1%	3	23,1%	3	23,1%	3	21,4%
DH (ESC)	3	3	42,9%	3	33,3%	3	23,1%	3	23,1%	3	23,1%	3	21,4%
AEB (Inter-Urban)	3					3	23,1%	3	23,1%	3	23,1%	3	21,4%
LDW/LKD	1					1	7,7%	1	7,7%	1	7,7%	2	14,3%
Total		7	100,0%	9	100,0%	13	100,0%	13	100,0%	13	100,0%	14	100,0%
5-star threshold		4,2	60%	5,85	65%	8,45	65%	9,1	70%	9,1	70%	9,8	70%
4-star threshold		2,8	40%	4,95	55%	7,15	55%	7,8	60%	7,8	60%	8,4	60%
Fitment requirements													
SBR				100,0%		100,0%		100,0%		100,0%		100,0%	
SAS				50,0%		50,0%		70,0%		100,0%		100,0%	
DH (ESC)				100,0%		100,0%		100,0%		100,0%		100,0%	
AEB (Inter-Urban)						50,0%		50,0%		70,0%		100,0%	
LDW/LKD						50,0%		50,0%		70,0%		100,0%	

40

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