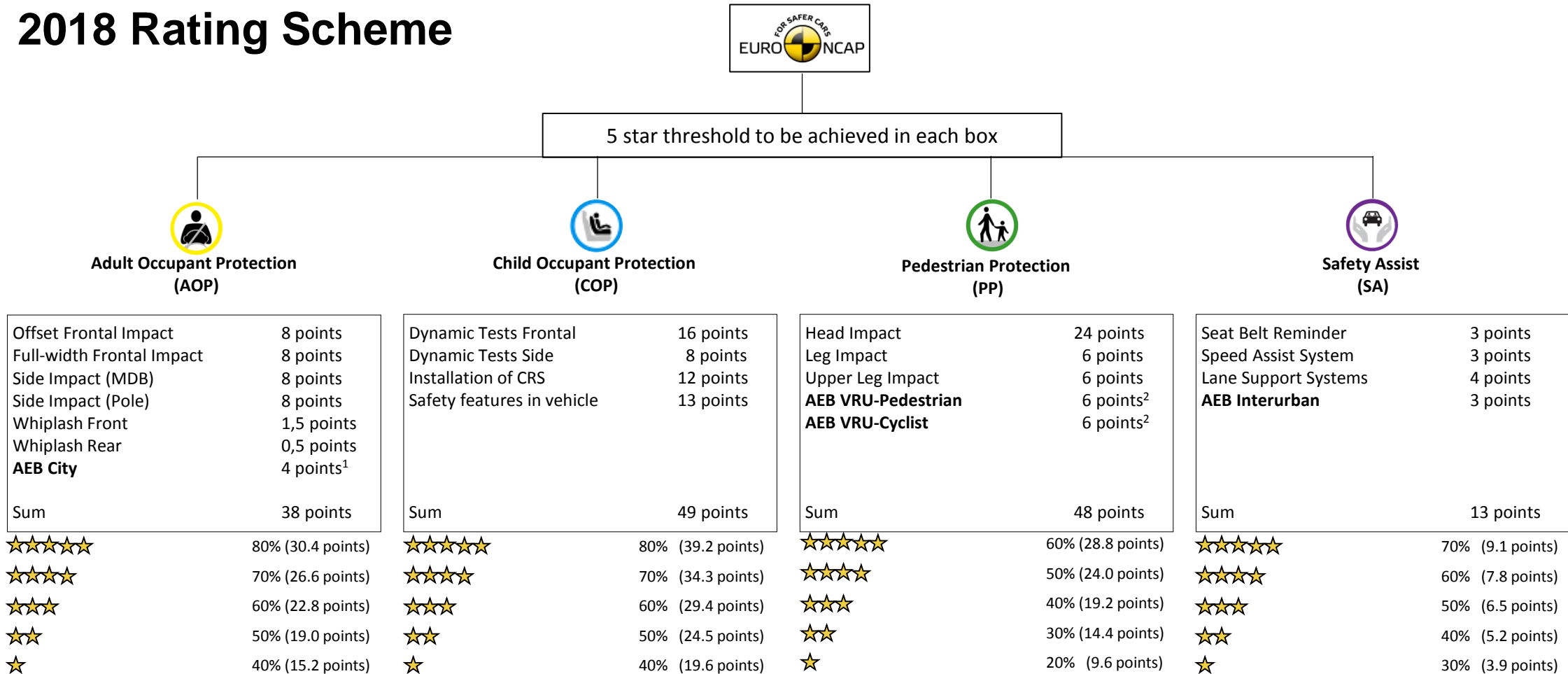# Overview

- Euro NCAP is a private consumer test organization, based in Leuven, Belgium,
  partly funded by European governments

- Euro NCAP was established in 1997

- Euro NCAP tests are optional,
  one does not need to have a valid star rating to be able to sell a vehicle in Europe

- Euro NCAP stars are intended to be consumer information,
  there is no other implication from the test results

OICA

CLEPA
European Association of Automotive Suppliers

2018 Rating Scheme

EURO NCAP
FOR SAFER CARS

5 star threshold to be achieved in each box

Adult Occupant Protection (AOP)

Offset Frontal Impact	8 points
Full-width Frontal Impact	8 points
Side Impact (MDB)	8 points
Side Impact (Pole)	8 points
Whiplash Front	1,5 points
Whiplash Rear	0,5 points
AEB City	**4 points[1]**
Sum	38 points

Stars	
★★★★★	80% (30.4 points)
★★★★	70% (26.6 points)
★★★	60% (22.8 points)
★★	50% (19.0 points)
★	40% (15.2 points)

Child Occupant Protection (COP)

Dynamic Tests Frontal	16 points
Dynamic Tests Side	8 points
Installation of CRS	12 points
Safety features in vehicle	13 points
Sum	49 points

Stars	
★★★★★	80% (39.2 points)
★★★★	70% (34.3 points)
★★★	60% (29.4 points)
★★	50% (24.5 points)
★	40% (19.6 points)

Pedestrian Protection (PP)

Head Impact	24 points
Leg Impact	6 points
Upper Leg Impact	6 points
AEB VRU-Pedestrian	**6 points[2]**
AEB VRU-Cyclist	**6 points[2]**
Sum	48 points

Stars	
★★★★★	60% (28.8 points)
★★★★	50% (24.0 points)
★★★	40% (19.2 points)
★★	30% (14.4 points)
★	20% (9.6 points)

Safety Assist (SA)

Seat Belt Reminder	3 points
Speed Assist System	3 points
Lane Support Systems	4 points
AEB Interurban	**3 points**
Sum	13 points

Stars	
★★★★★	70% (9.1 points)
★★★★	60% (7.8 points)
★★★	50% (6.5 points)
★★	40% (5.2 points)
★	30% (3.9 points)

1: minimum 1,0 points for Whiplash Front required to gain any AEB City points

2: minimum 22,0 points for passive safety measures inside the PP box required to gain any AEB VRU points

**a car with a five star rating does not need to have any AEB system**

AEB Vehicle-to-Vehicle

- **AEB V2V** is part of the rating since 2014

- Scoring is based on collision speed

- **AEB City:**   - **A**dult **O**ccupant **P**rotection Box (4/38 points) (max. speed tested 50 km/h)
  - Automatic Intervention
  - stationary target only

- **AEB Interurban:**   - **S**afety **A**ssist Box (3/13 points) (max. speed tested 80 km/h)
  - **F**orward **C**ollision **W**arning followed by **D**ynamic **B**rake **S**upport
    and/or Automatic Intervention
  - stationary, moving and braking target

- Rating of FCW/DBS is based also on collision speed (pre-configured brake robot triggered by FCW)

AEB City Test Scenarios

Total **45 AEB City tests:**

- **Stationary target vehicle (GVT)**
- **9 different ego speeds** (10 km/h – 50 km/h in steps of 5 km/h)
- **5 different variants of lateral overlap**
  (50% left - 75% left - 100% - 75% right - 50% right)
- Score is dependent on impact speed.
- Initially tests are performed by the OEM "at home",
  Euro NCAP does not participate in these tests
- Results of these tests will be handed to Euro NCAP based on
  the "**Grid method**".
- **Euro NCAP will perform sample tests** to verify the results,
  a correction factor could apply
- **Total score: 4 points**
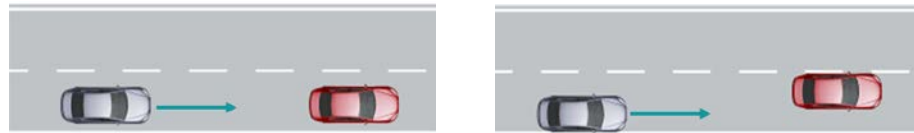
Full score (4 points):
- **No collision at 10 – 20 km/h**
- **max. 5 km/h impact speed at 25 – 50 km/h**

GRID example:

Overlap

v_0	50% L	75% L	100%	75% R	50% R
50					
45					
40					
35					
30					
25					
20					
15					
10					

VUT Test Speed
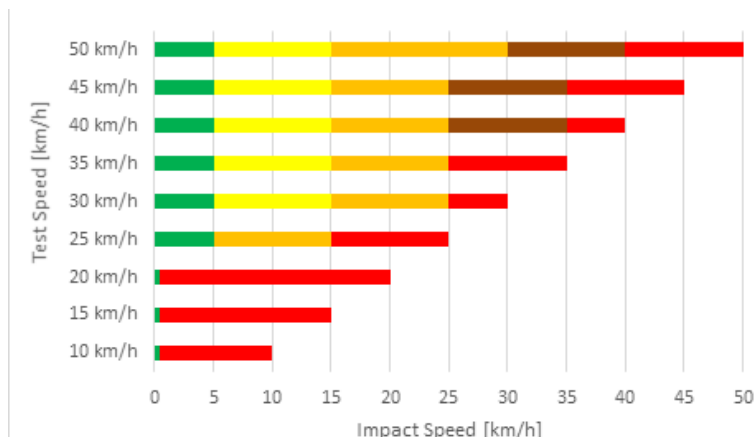
AEB Interurban Test Scenarios

Stationary target vehicle (CCRs)
Ego: 30 – 80 km/h

Test of FCW/DBS only (braking robot) (30-80 km/h)

Slower target vehicle (CCRm)
Ego: 30 – 80 km/h
Target: 20 km/h

Test of Automatic Intervention (30-80 km/h) and/or FCW/DBS (braking robot) (50-80 km/h)

Braking target vehicle (CCRb)
Distance: 12/40m
Ego: 50 km/h, Target: -2/-6 m/s²

Test of Automatic Intervention and/or FCW/DBS (braking robot)

Grid approach
- as in AEB City
- variation of overlap value for CCRs and CCRm test
- 100% overlap only for CCRm test

For full score (3 points, combination of Automatic Intervention (1.5), FCW/DBS (1.0) and HMI (0.5)):
- **max. 5 km/h (relative) impact speed allowed across the complete speed range**

AEB Vehicle-to-Pedestrian

- AEB V2P is part of the rating since 2016

- Pedestrian/VRU Protection Box (6/48 Points)

- Tests during daylight and obscure light conditions

- Lateral and longitudinal tests
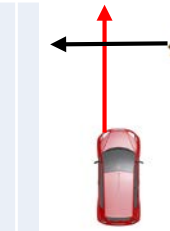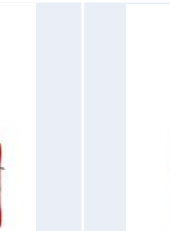
- Rating is based on collision speed
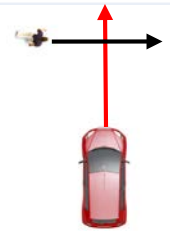
AEB VRU Pedestrian Scenarios

6 Points in total:
- **3 Points for day tests**
- **3 Points for night test**

Test conduct:
- All tests performed by Euro NCAP
- OEM has a prediction for performance
- If deviation between prediction and test results:
  Test may be repeated

	CPFA-50	CPNA-25	CPNA-75	CPNC-50	CPLA-50	CPLA-25
VUT speed	20-60 km/h	20-60 km/h	20-60 km/h	20-60 km/h	20-60 km/h	50-80 km/h
Ped speed	8 km/h	5 km/h	5 km/h	5 km/h	5 km/h	5 km/h
Obstruction	No	No	No	Yes	No	No
Impact point	50%	25%	75%	50%	50%	25%
AEB/FCW	AEB	AEB	AEB	AEB	AEB	FCW

AEB VRU Pedestrian Scoring Principle

- Lateral Scenarios (CPFA-50, CPNA-25, CPNA-75, CPNC-50):

v₀ (km/h)	20	25	30	35	40	45	50	55	60
	Scoring by linear sliding scale (e.g. 40% speed reduction → 40% score)					Min. speed reduction of 20km/h per test PASS/FAIL			

- Longitudinal Scenario Braking (CPLA-50):

v₀ (km/h)	20	25	30	35	40	45	50	55	60
	Scoring by linear sliding scale (e.g. 40% speed reduction → 40% score)					Min. speed reduction of 20km/h per test PASS/FAIL			

- Longitudinal Scenario Warning (CPLA-25):

v₀ (km/h)	50	55	60	65	70	75	80
	FCW warning at TTC >= 1.7s per test PASS/FAIL						

Full score (6 points):
- **No collision at 20 – 40 km/h**
- **Min. speed reduction of 20 km/h from 45 km/h onwards**
- **Warning at min. 1.7 TTC for CPLA-25 scenario**

AEB Vehicle-to-Bicyclist

- AEB V2B is part of the rating since 2018

- Pedestrian/VRU Protection Box (6/48 Points)

- Tests during daylight conditions

- Lateral and longitudinal tests

- Rating is based on collision speed

AEB VRU Bicyclist Scenarios

6 Points in total

Test conduct:

- All tests performed by Euro NCAP
- OEM has a prediction for performance
- If deviation between prediction and test results: Test may be repeated

	CBNA-50	CBLA-50	CBLA-25
VUT speed	20-60 km/h	25-60 km/h	50-80 km/h
Cyclist speed	15 km/h	15 km/h	20 km/h
Obstruction	No	No	No
Impact point	50%	50%	25%
AEB/FCW	AEB	AEB	FCW

AEB VRU Bicyclist Scoring Principle

- Lateral Scenario (CBNA-50:

v₀ (km/h)	20	25	30	35	40	45	50	55	60
	Scoring by linear sliding scale (e.g. 40% speed reduction → 40% score)					Min. speed reduction of 20km/h per test PASS/FAIL			

- Longitudinal Scenario Braking (CBLA-50):

v₀ (km/h)	25	30	35	40	45	50	55	60
	Scoring by linear sliding scale (e.g. 40% speed reduction → 40% score)				Min. speed reduction of 20km/h per test PASS/FAIL			

- Longitudinal Scenario Warning (CBLA-25):

v₀ (km/h)	50	55	60	65	70	75	80
	FCW warning at TTC >= 1.7s per test PASS/FAIL						

Full score (6 points):
- **No collision at 20/25 – 40 km/h**
- **Min. speed reduction of 20 km/h from 45 km/h onwards**
- **Warning at min. 1.7 TTC for CBLA-25 scenario**

Summary

- Euro NCAP tests are optional, one does not need to have a valid star rating to be able to sell a vehicle in Europe

- Euro NCAP stars are intended to be consumer information, there is no other implication from the test results

- until today (2018) AEB is <u>no</u> prerequisite for a five star rating

- some AEB tests are sample tests only

- in some cases it is possible to repeat a failed AEB test,
  or repeat a test where the result deviates from the prediction of the OEM

- full collision avoidance across the complete defined speed range is <u>not</u> required for a full score in any AEB test scenario