

General Safety Regulation 5: AEBS –  
Proportion of M1 vehicles likely to pass the  
vehicle to pedestrian test of proposed draft  
regulation

June 2019

# Proposed AEB vehicle to pedestrian test

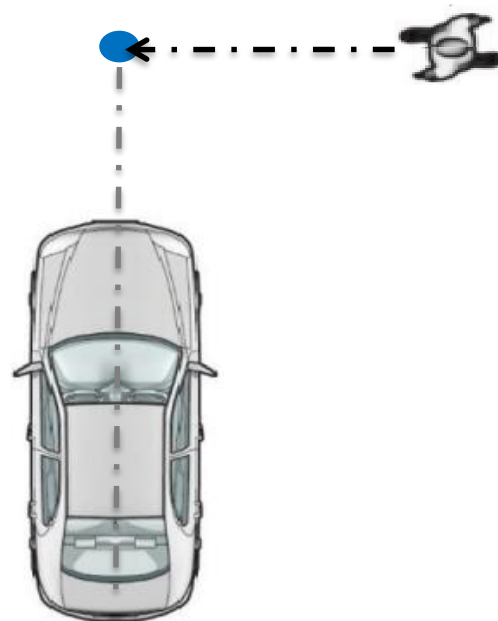


**UNECE**

## Draft Regulation:

- Impact with car on **centreline (50% width)**
- Pedestrian crossing at **5 km/h**
- **20 – 60 km/h** test speed
- Maximum mass & Mass in running order

50% width



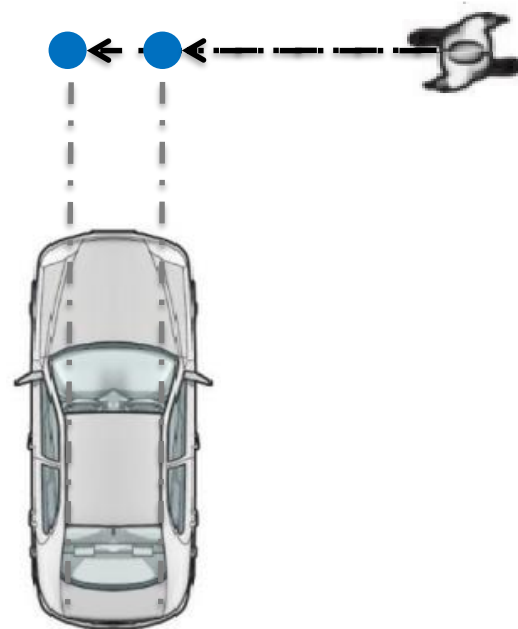
# Euro NCAP AEB vehicle to pedestrian test (2016 onwards)



## CPNA-25 & CPNA-75:

- Tests with most similarity to proposed regulatory test
- Impact point at **25% & 75% of vehicle width**
- Pedestrian crossing at **5 km/h**
- **20-60 km/h** test speed
- 200 kg ballast
- Results taken from assessments of 70 cars

75% & 25% width



# Proposed staged assessment in draft regulation

- The draft AEB regulation proposes a two stepped approach

## Step one: from 2022

- Avoidance (no collision) below **35 km/h**
- Minimum of **15 km/h** speed reduction from 35 – 60 km/h
- Equal for both payloads

## Step two: from 2024

- Avoidance (no collision) below **42 km/h**
- Minimum of **32 km/h** speed reduction at 42 km/h
- Minimum of **30 km/h** speed reduction at 45 km/h
- Minimum of **25 km/h** speed reduction from 50-60 km/h

Subject vehicle speed (km/h)	Maximum mass	Mass in running order
20	0.00	0.00
25	0.00	0.00
30	0.00	0.00
35	20.00	20.00
40	25.00	25.00
45	30.00	30.00
50	35.00	35.00
55	40.00	40.00
60	45.00	45.00

AEBS-08-07 Draft Suppl.1 to R AEBS M1N1

Subject vehicle speed (km/h)	Maximum mass	Mass in running order
20	0.00	0.00
25	0.00	0.00
30	0.00	0.00
35	0.00	0.00
40	0.00	0.00
42	10.00	0.00
45	[15.00]	[15.00]
50	[25.00]	[25.00]
55	[30.00]	[30.00]
60	[35.00]	[35.00]

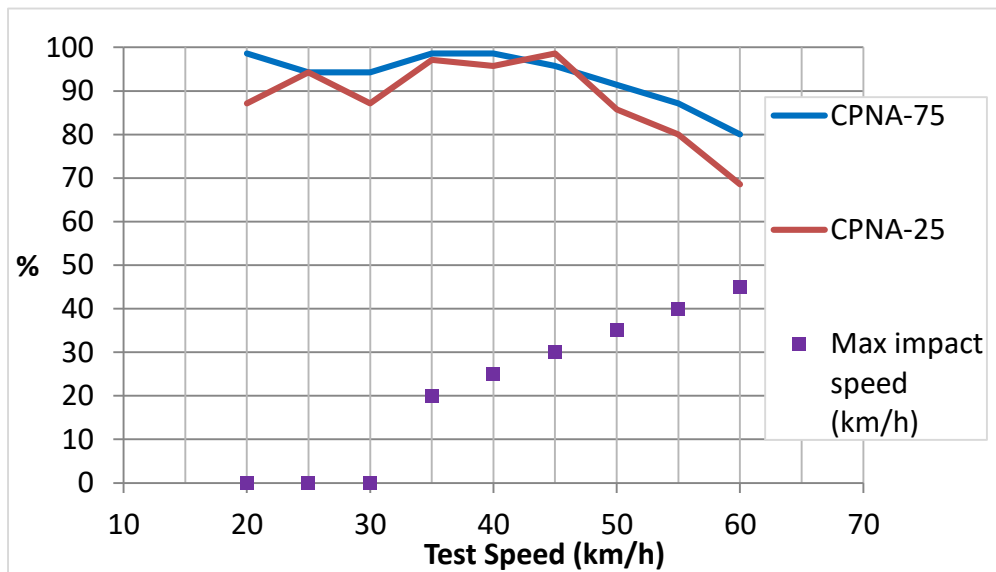
V2P/M1/Second step - ECE/TRANS/WP.29/GRVA/2019/5

# First step – Proportion pass

Test Type	Relative test speed (km/h)	Maximum Impact speed (km/h) <sup>1</sup> :	Proportion of Euro NCAP test vehicles meeting requirements	
			CPNA-25 %	CPNA-75 %
Pedestrian crossing from nearside (CPNA)	20	0	87	99
	25	0	94	94
	30	0	87	94
	35	20	97	99
	40	25	96	99
	45	30	99	96
	50	35	86	91
	55	40	80	87
	60	45	69	80

Proportion of NCAP tested vehicles meeting proposed maximum impact speeds for first step AEB pedestrian. (Data: Euro NCAP 2016-18)

- Higher pass % for CPNA-75 except at 45 km/h
- > ≈ 90% between 20-45 km/h
- Compliance decreases above 45 km/h
- Lowest compliance at 60 km/h

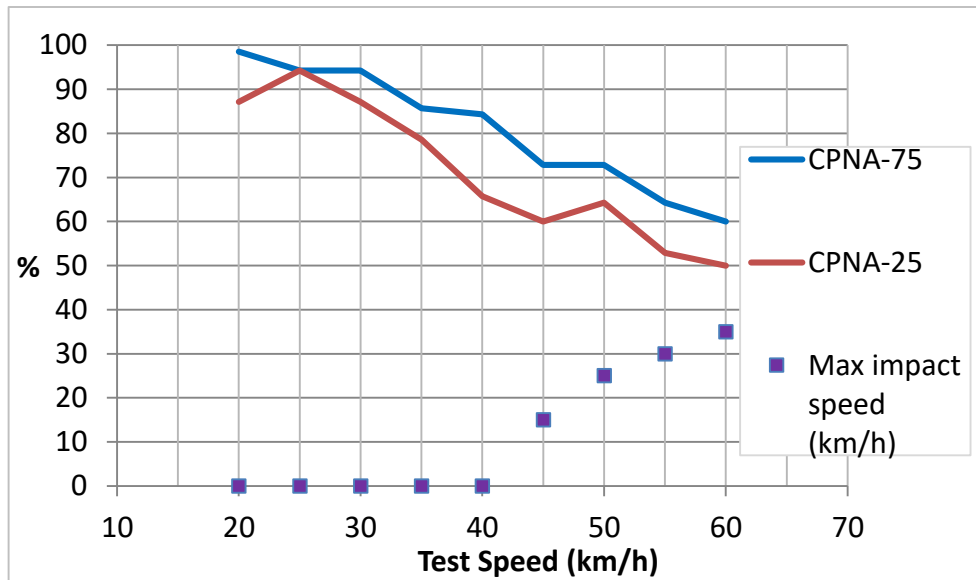


# Second step – Proportion pass

Test Type	Relative test speed (km/h)	Maximum Impact speed (km/h) <sup>1</sup> :	Proportion of Euro NCAP test vehicles meeting requirements	
		M1 Unladen	CPNA-25 %	CPNA-75 %
Pedestrian crossing from nearside (CPNA)	20	0	87	99
	25	0	94	94
	30	0	87	94
	35	0	79	86
	40	0	66	84
	45	15	60	73
	50	25	64	73
	55	30	53	64
	60	35	50	60

Proportion of NCAP tested vehicles meeting proposed maximum impact speeds for second step AEB pedestrian (Data: EuroNCAP 2016-18)

- Higher % for CPNA-75
- Steady decrease in compliance with increasing test speed
- Lowest compliance at 60 km/h



# CLEPA-OICA Proposed Second Step

- Industry proposed an alternative set of collision speeds for the second stage at AEBS-07

## OICA-CLEPA Second step - Entry in 2024

- No collision below 42 km/h (**unchanged**)
- 42 km/h**
  - Minimum of **9 km/h** speed reduction
  - 32 km/h** proposed in original
- 45 – 60 km/h**
  - Minimum of **15 km/h** speed reduction
  - 30 km/h** at 45 km/h and **25 km/h** from 50-60 km/h in original
- Equal for Maximum mass and Mass in running order

<i>Subject vehicle speed (km/h)</i>	<i>Laden</i>	<i>Unladen</i>
20	0.00	0.00
25	0.00	0.00
30	0.00	0.00
35	0.00	0.00
40	0.00	0.00
42	<del>10.00</del> <b>27.00</b>	0.00
45	<del>15.00</del> <b>30.00</b>	<del>15.00</del> <b>30.00</b>
50	<del>25.00</del> <b>35.00</b>	<del>25.00</del> <b>35.00</b>
55	<del>30.00</del> <b>40.00</b>	<del>30.00</del> <b>40.00</b>
60	<del>35.00</del> <b>45.00</b>	<del>35.00</del> <b>45.00</b>

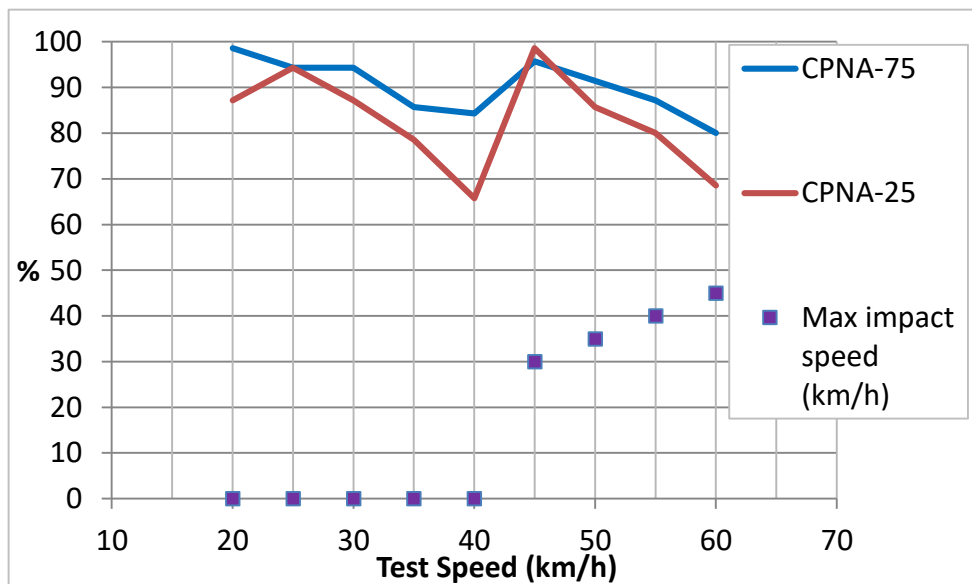
[AEBS-08-04-r1 (CLEPA-OICA) Completed input to AEBS-08]

# OICA-CLEPA Proposed Stage Two – Proportion pass

Test Type	Relative test speed (km/h)	Maximum Impact speed (km/h) <sup>1</sup> :	Proportion of EuroNCAP test vehicles meeting requirements	
		M1 Unladen	CPNA-25 %	CPNA-75 %
Pedestrian crossing from nearside (CPNA)	20	0	87	99
	25	0	94	94
	30	0	87	94
	35	0	79	86
	40	0	66	84
	45	30	99	96
	50	35	86	91
	55	40	80	87
	60	45	69	80

Proportion of NCAP tested vehicles meeting proposed maximum impact speeds for second step AEB pedestrian (Data: EuroNCAP 2016-18)

- Increased pass % above 40 km/h
- Lowest compliance at 40 & 60 km/h





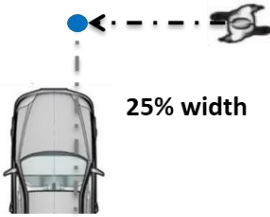
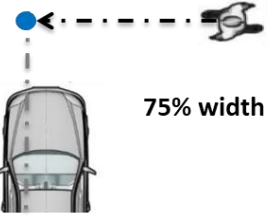
# Observations & Conclusions

## Homologation requires PASS at all test speeds:

- 61-73% of vehicles would pass homologation with first step
- 29-49% would pass second step
- 44-63% would pass CLEPA-OICA second step

## Conclusions:

- Decreasing compliance with increasing test speed
- Second step requirement for avoidance up to 40 km/h reduced compliance by about 20%
- Increasing permissible collision speed above 40 km/h will increase homologation %

Vehicle that pass at all test speeds (%)	 25% width <b>CPNA-25</b>	 75% width <b>CPNA-75</b>
<b>Draft Stage One</b>	61%	73%
<b>Draft Stage Two</b>	29%	49%
<b>Stage Two (CLEPA-OICA)</b>	44%	63%

Proportion of NCAP tested vehicles that pass at all proposed vehicle test speeds. (Data: EuroNCAP 2016-18)