




D Y N A M I C T E S T W I T H 3 P O I N T S E A T
B E L T S S E A T S

July, 2021

 PUBLIC

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TEST MATRIX

- CRSs: Infant Carrier, Toddler, Booster cushion
- Dummies: Q1.5, Q3, Q6 and Q10
- Seat distance: Un Regulation 80
- Test pulse: UN Regulation 80

DUMMY	DESCRIPTION	3 POINT SEAT BELT WITH CRS	3 POINT SEAT BELT
Q 1,5	Infant carrier UN Regulation 129 belted	X	X
Q3	Toddler UN Regulation 44	X	X
Q6	Booster cushion UN Regulation 44	X	X
Q10	Booster cushion UN Regulation 44	X	X

TESTS RESULTS Q 1,5 AND Q3

Q1,5 DUMMY WITHOUT CRS



TESTS RESULTS Q 1,5 AND Q3

Q1,5 DUMMY WITHOUT CRS

Head

- HPC: 131.39 < 600
- Head Acc 3ms: 41.59 g < 75 g

Neck

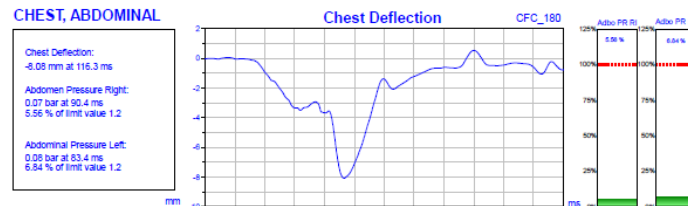
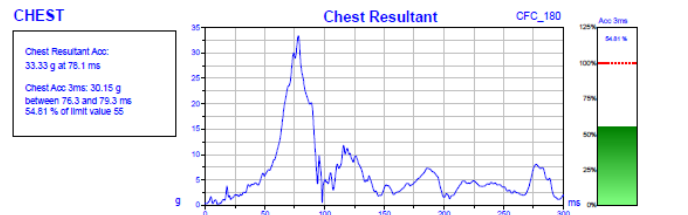
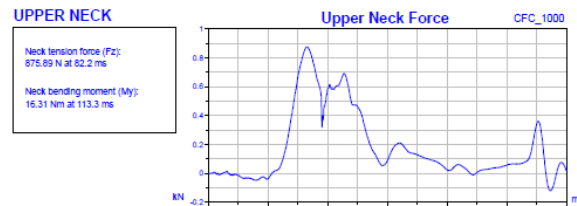
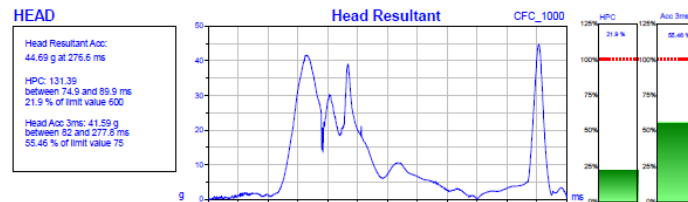
- Neck tension force (Fz): 875.89 N
- Neck bending moment (My): 16.31 Nm

Chest

- Chest Acc 3ms: 30.15 g < 55g
- Chest Deflection: -8.08 mm

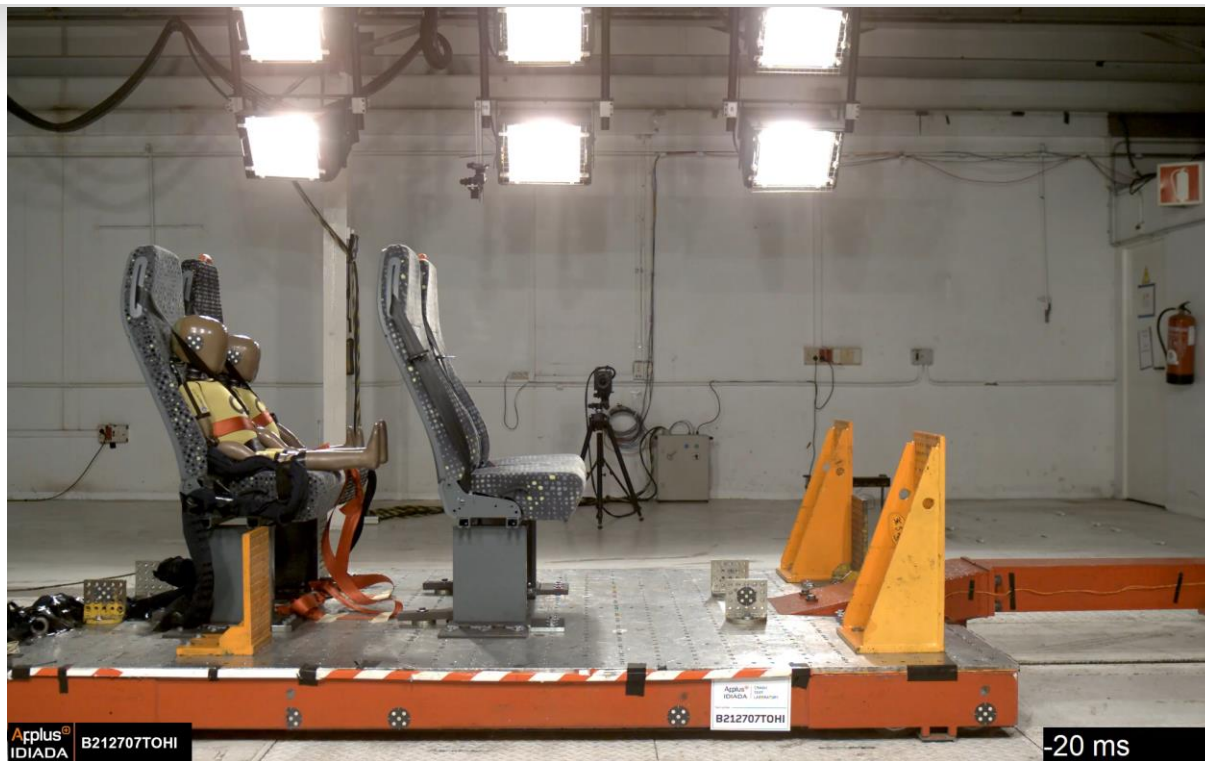
Abdomen

- Abdomen Pressure Right: 0.07 bar < 1,2 bar
- Abdominal Pressure Left: 0.08 bar < 1,2 bar



TESTS RESULTS Q 1,5 AND Q3

Q3 DUMMY WITHOUT CRS



TESTS RESULTS Q 1,5 AND Q3

Q3 DUMMY WITHOUT CRS

Head

- HPC: 83.62 < 800
- Head Acc 3ms: 40.49 g < 80 g

Neck

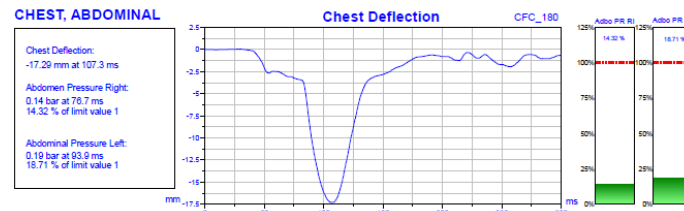
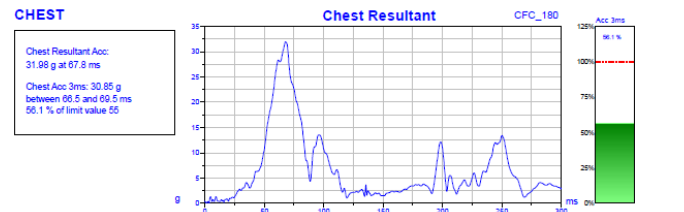
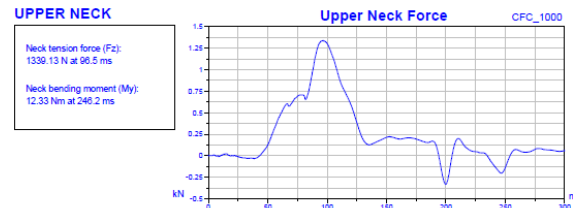
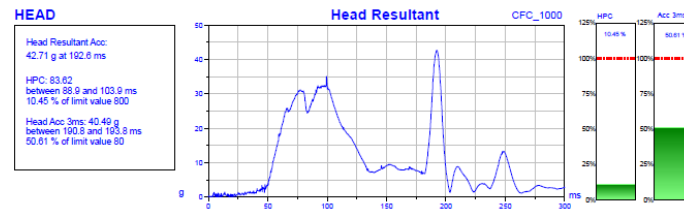
- Neck tension force (Fz): 1339.13 N
- Neck bending moment (My): 12.33 Nm

Chest

- Chest Acc 3ms: 30.85 g < 55g
- Chest Deflection: -17.29 mm

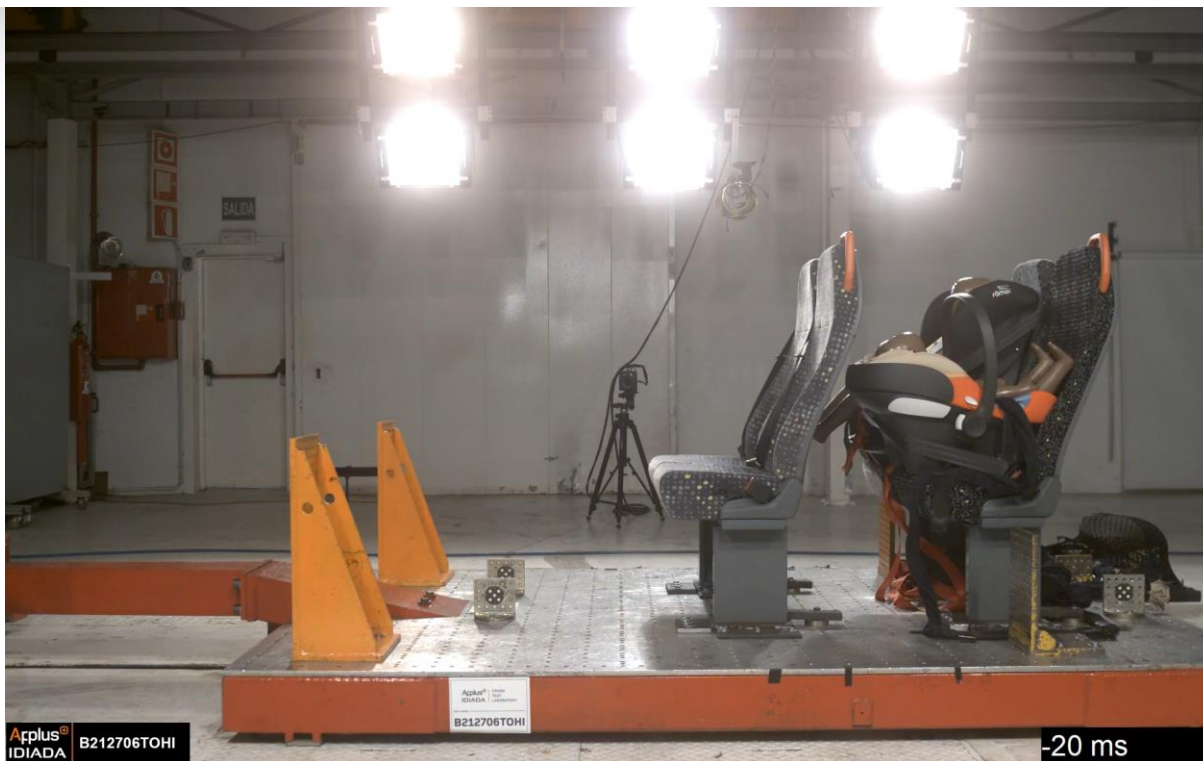
Abdomen

- Abdomen Pressure Right: 0.14 bar < 1 bar
- Abdominal Pressure Left: 0.19 bar < 1 bar



TESTS RESULTS Q 1,5 AND Q3

Q1,5 DUMMY WITH CRS



TESTS RESULTS Q 1,5 AND Q3

Q1,5 DUMMY WITH CRS

Head

- HPC: 375.35 < 600
- Head Acc 3ms: 82.54 g < 75 g

Neck

- Neck tension force (Fz): 330.65 N
- Neck bending moment (My): 15.98 Nm

Chest

- Chest Acc 3ms: 41.43 g < 55g
- Chest Deflection: -4.78 mm

Abdomen

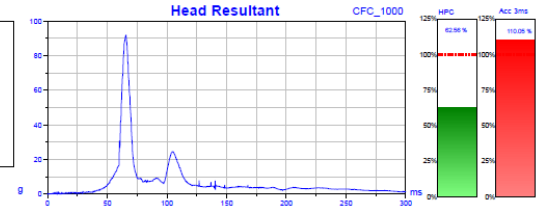
- Abdomen Pressure Right: 0.05 bar < 1,2 bar
- Abdominal Pressure Left: 0.05 bar < 1,2 bar

HEAD

Head Resultant Acc:
62 g at 66.6 ms

HPC: 375.35
between 61.5 and 69.9 ms
62.56 % of limit value 600

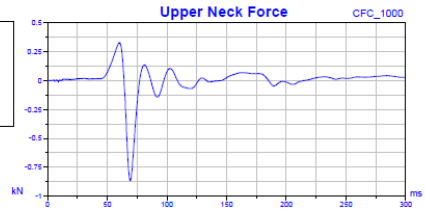
Head Acc 3ms: 82.54 g
between 63.9 and 66.9 ms
110.05 % of limit value 75



UPPER NECK

Neck tension force (Fz):
330.65 N at 59.9 ms

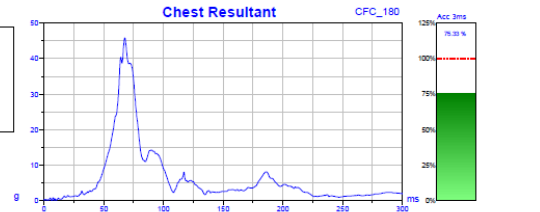
Neck bending moment (My):
15.98 Nm at 94.9 ms



CHEST

Chest Resultant Acc:
45.6 g at 67.6 ms

Chest Acc 3ms: 41.43 g
between 66.2 and 69.2 ms
75.33 % of limit value 55

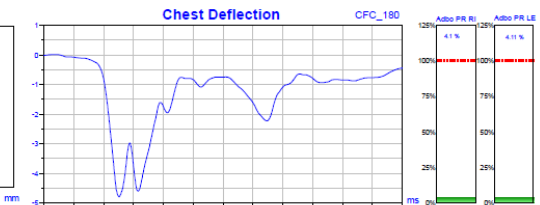


CHEST, ABDOMINAL

Chest Deflection:
-4.78 mm at 62.9 ms

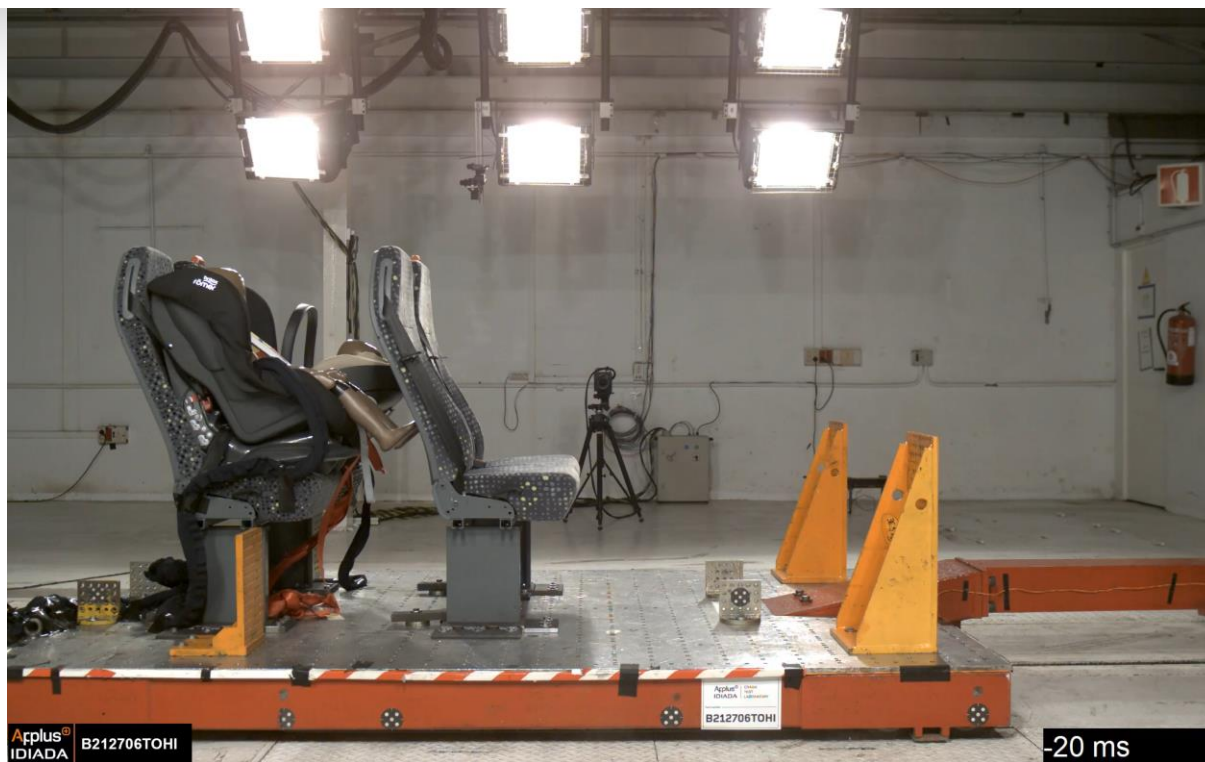
Abdomen Pressure Right:
0.05 bar at 86.5 ms
4.1 % of limit value 1.2

Abdominal Pressure Left:
0.05 bar at 107.6 ms
4.11 % of limit value 1.2



TESTS RESULTS Q 1,5 AND Q3

Q3 DUMMY WITH CRS



TESTS RESULTS Q 1,5 AND Q3

Q3 DUMMY WITH CRS

Head

- HPC: 289.79 < 800
- Head Acc 3ms: 63.48 g < 80 g

Neck

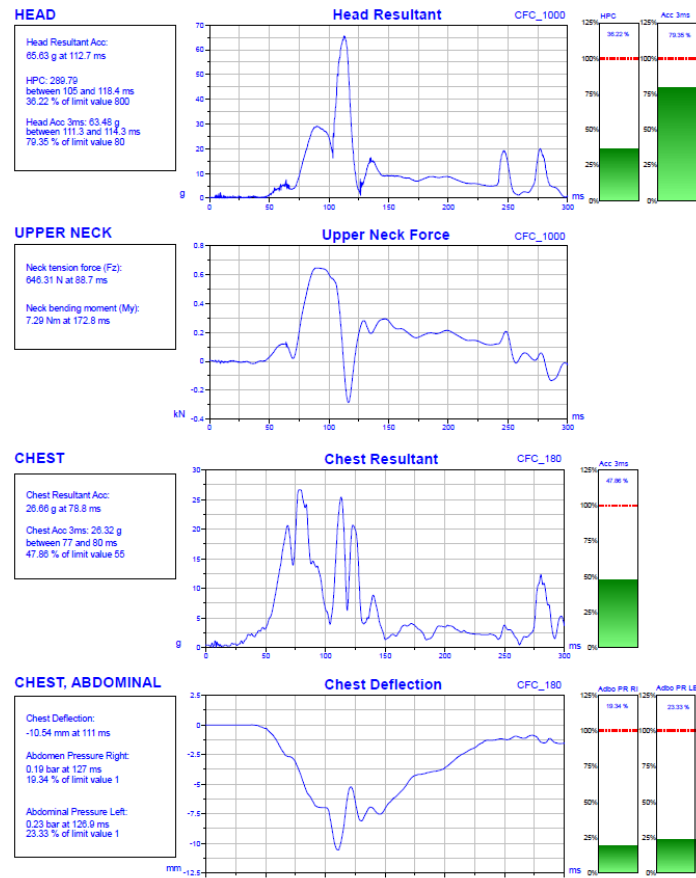
- Neck tension force (Fz): 646.31 N
- Neck bending moment (My): 7.29 Nm

Chest

- Chest Acc 3ms: 26.32 g < 55g
- Chest Deflection: -10.54 mm

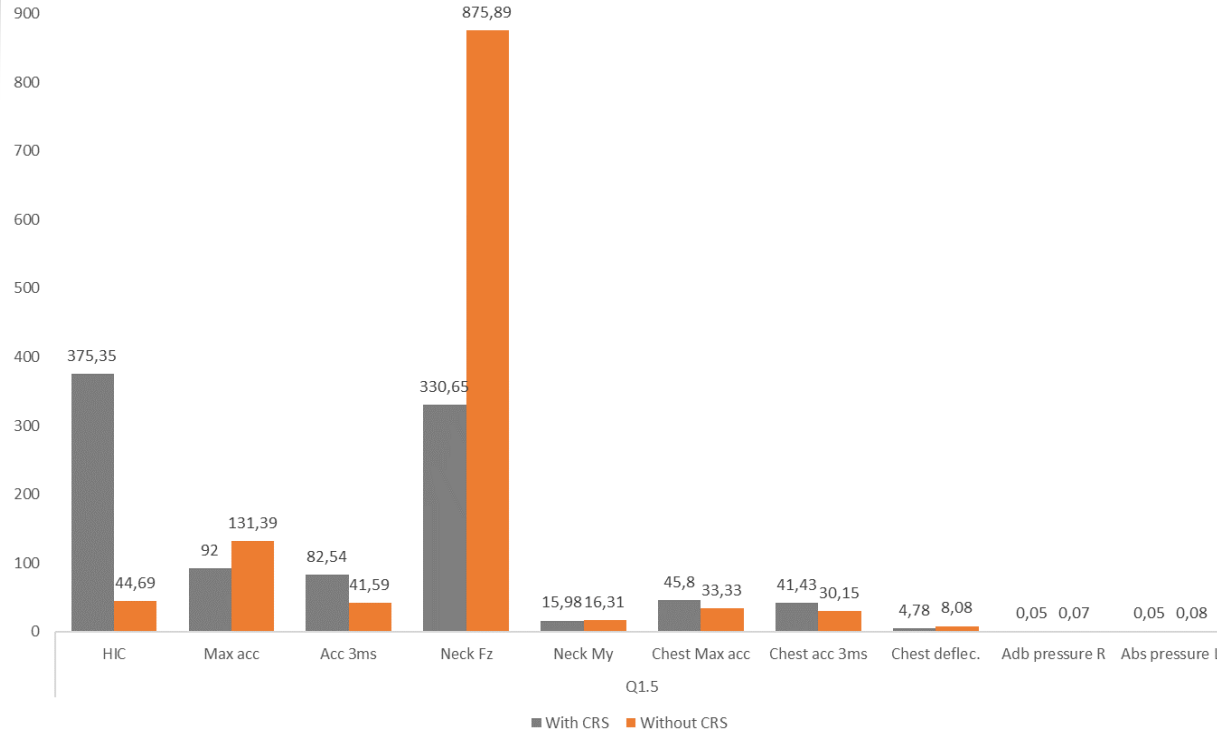
Abdomen

- Abdomen Pressure Right: 0.19 bar < 1 bar
- Abdominal Pressure Left: 0.23 bar < 1 bar



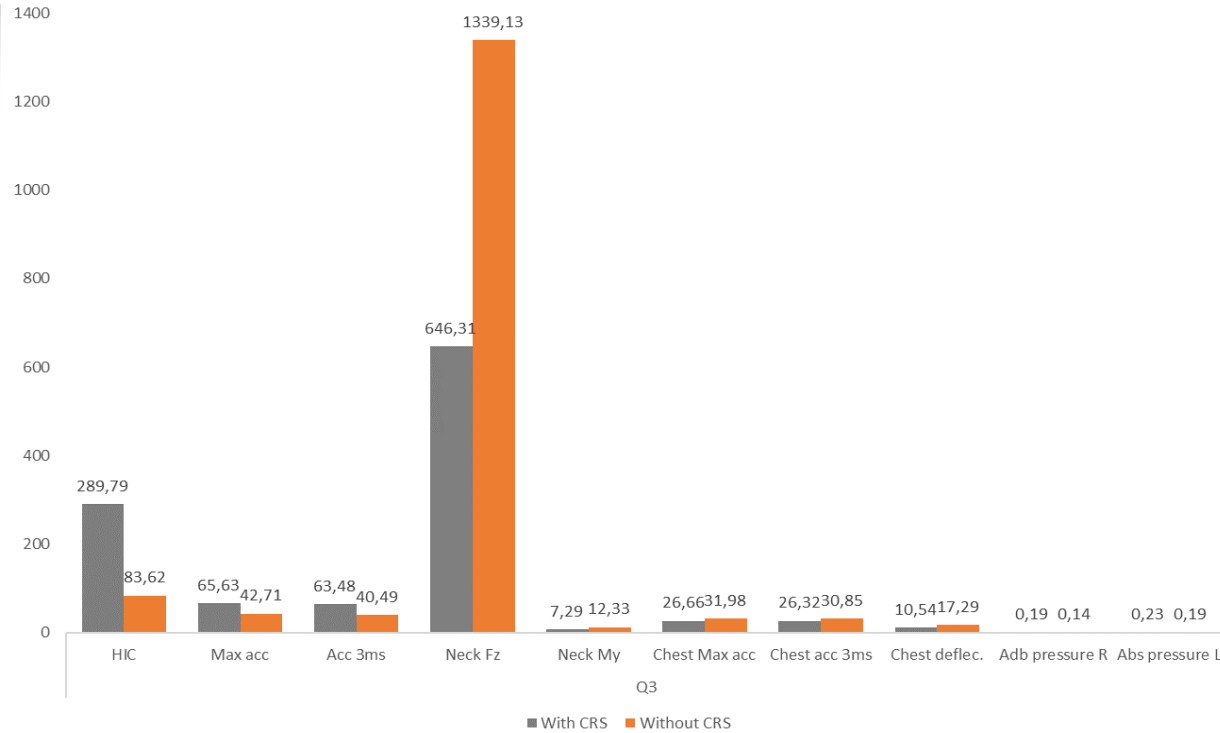
TESTS RESULTS Q 1,5 AND Q3

Q1,5 DUMMY COMPARISON



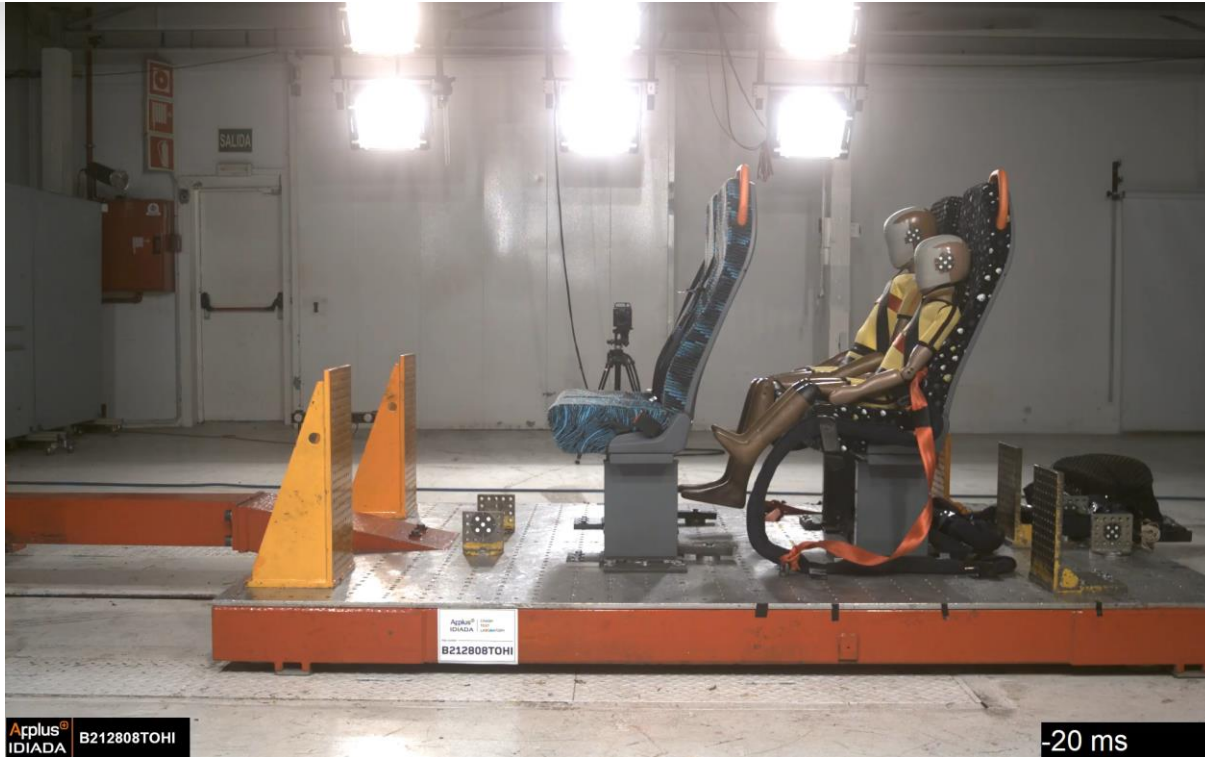
TESTS RESULTS Q 1,5 AND Q3

Q3 DUMMY COMPARISON



TESTS RESULTS Q 6 AND Q10

Q6 DUMMY WITHOUT CRS



TESTS RESULTS Q 6 AND Q10

Q6 DUMMY WITHOUT CRS

Head

- HPC: 226.63 < 800
- Head Acc 3ms: 65.9 g < 80 g

Neck

- Neck tension force (Fz): 923.14 N
- Neck bending moment (My): 41.05 Nm

Chest

- Chest Acc 3ms: 30.58 g < 55g
- Chest Deflection: -12.8 mm

Abdomen

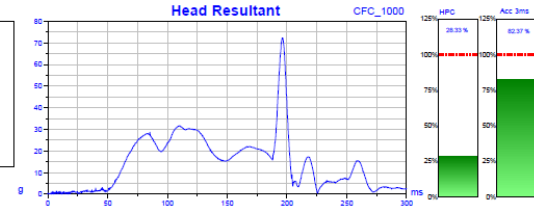
- Abdomen Pressure Right: 0.13 bar < 1 bar
- Abdominal Pressure Left: 0.10 bar < 1 bar

HEAD

Head Resultant Acc:
72.27 g at 196.3 ms

HPC: 226.63
between 191.5 and 200.6 ms
28.33 % of limit value 800

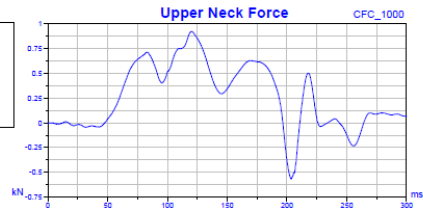
Head Acc 3ms: 65.9 g
between 194.7 and 197.7 ms
82.37 % of limit value 80



UPPER NECK

Neck tension force (Fz):
923.14 N at 120.5 ms

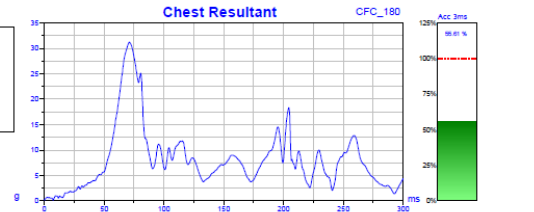
Neck bending moment (My):
41.05 Nm at 123.9 ms



CHEST

Chest Resultant Acc:
31.22 g at 71.1 ms

Chest Acc 3ms: 30.58 g
between 69.8 and 72.8 ms
55.61 % of limit value 55

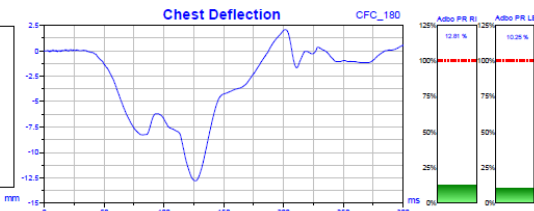


CHEST, ABDOMINAL

Chest Deflection:
-12.8 mm at 126.5 ms

Abdomen Pressure Right:
0.13 bar at 79.9 ms
12.81 % of limit value 1

Abdominal Pressure Left:
0.1 bar at 72.2 ms
10.25 % of limit value 1



TESTS RESULTS Q 6 AND Q10

Q10 DUMMY WITHOUT CRS



TESTS RESULTS Q 6 AND Q10

Q10 DUMMY WITHOUT CRS

Head

- HPC: 94.2 < 800
- Head Acc 3ms: 37.32 g < 80 g

Neck

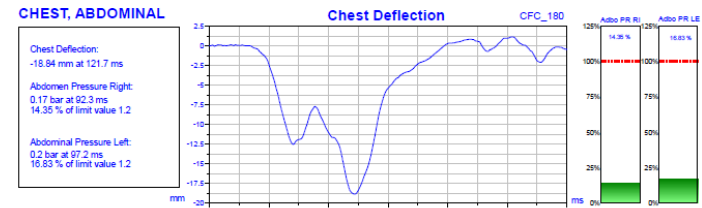
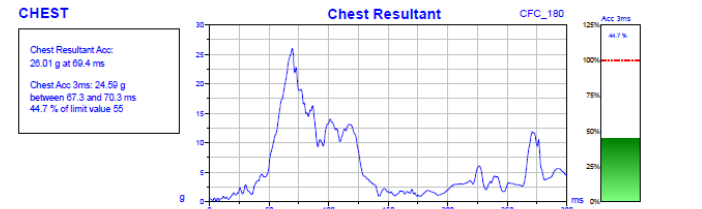
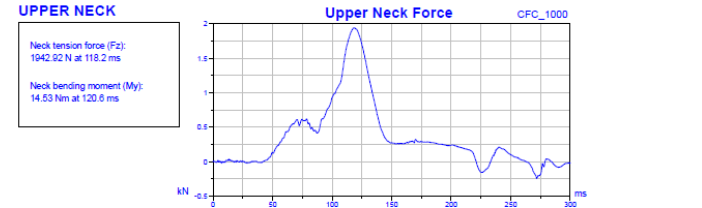
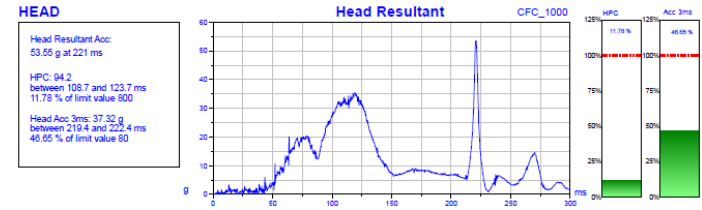
- Neck tension force (Fz): 1942.92 N
- Neck bending moment (My): 14.53 Nm

Chest

- Chest Acc 3ms: 24.59 g < 55g
- Chest Deflection: -18.84mm

Abdomen

- Abdomen Pressure Right: 0.17 bar < 1.2 bar
- Abdominal Pressure Left: 0.20 bar < 1.2 bar



TESTS RESULTS Q 6 AND Q10

Q6 DUMMY WITH CRS



TESTS RESULTS Q 6 AND Q10

Q6 DUMMY WITHOUT CRS

Head

- HPC: 95.31 < 800
- Head Acc 3ms: 44.67 g < 80 g

Neck

- Neck tension force (Fz): 868.61 N
- Neck bending moment (My): 28.54 Nm

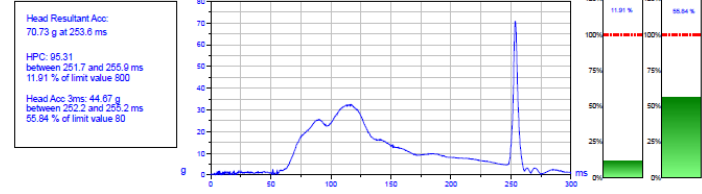
Chest

- Chest Acc 3ms: 25.09 g < 55g
- Chest Deflection: -14.5 mm

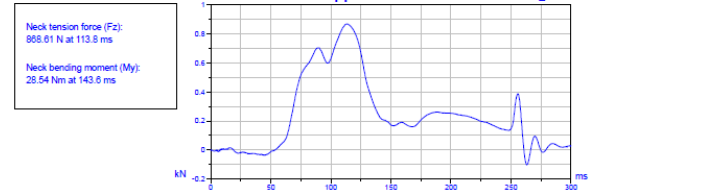
Abdomen

- Abdomen Pressure Right: 0.11 bar < 1 bar
- Abdominal Pressure Left: 0.13 bar < 1 bar

HEAD



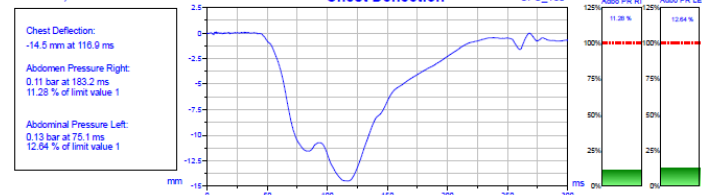
UPPER NECK



CHEST



CHEST, ABDOMINAL



TESTS RESULTS Q 6 AND Q10

Q10 DUMMY WITH CRS



TESTS RESULTS Q 6 AND Q10

Q10 DUMMY WITH CRS

Head

- HPC: 63.92 < 800
- Head Acc 3ms: 28.73 g < 80 g

Neck

- Neck tension force (Fz): 1542.02 N
- Neck bending moment (My): 11.17 Nm

Chest

- Chest Acc 3ms: 19.55 g < 55g
- Chest Deflection: -21.98 mm

Abdomen

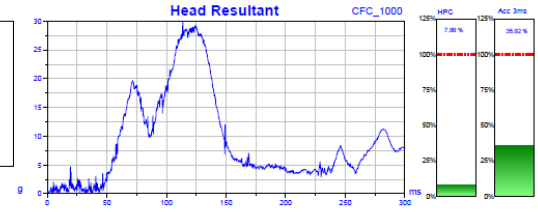
- Abdomen Pressure Right: 0.14 bar < 1.2 bar
- Abdominal Pressure Left: 0.23 bar < 1.2 bar

HEAD

Head Resultant Acc:
29.97 g at 113.8 ms

HPC: 63.92
between 113.4 and 128.4 ms
7.99 % of limit value 800

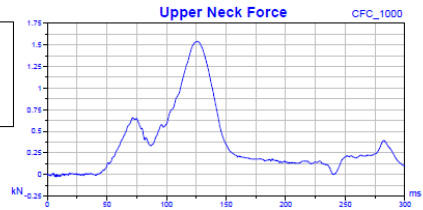
Head Acc 3ms: 28.73 g
between 113.6 and 125.3 ms
35.92 % of limit value 80



UPPER NECK

Neck tension force (Fz):
1542.02 N at 126 ms

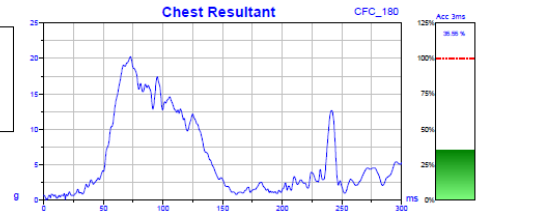
Neck bending moment (My):
11.17 Nm at 128.3 ms



CHEST

Chest Resultant Acc:
20.24 g at 72.7 ms

Chest Acc 3ms: 19.55 g
between 70.5 and 73.5 ms
35.55 % of limit value 55

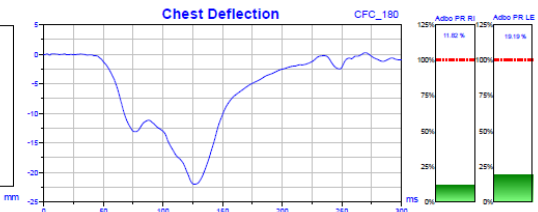


CHEST, ABDOMINAL

Chest Deflection:
-21.98 mm at 126.4 ms

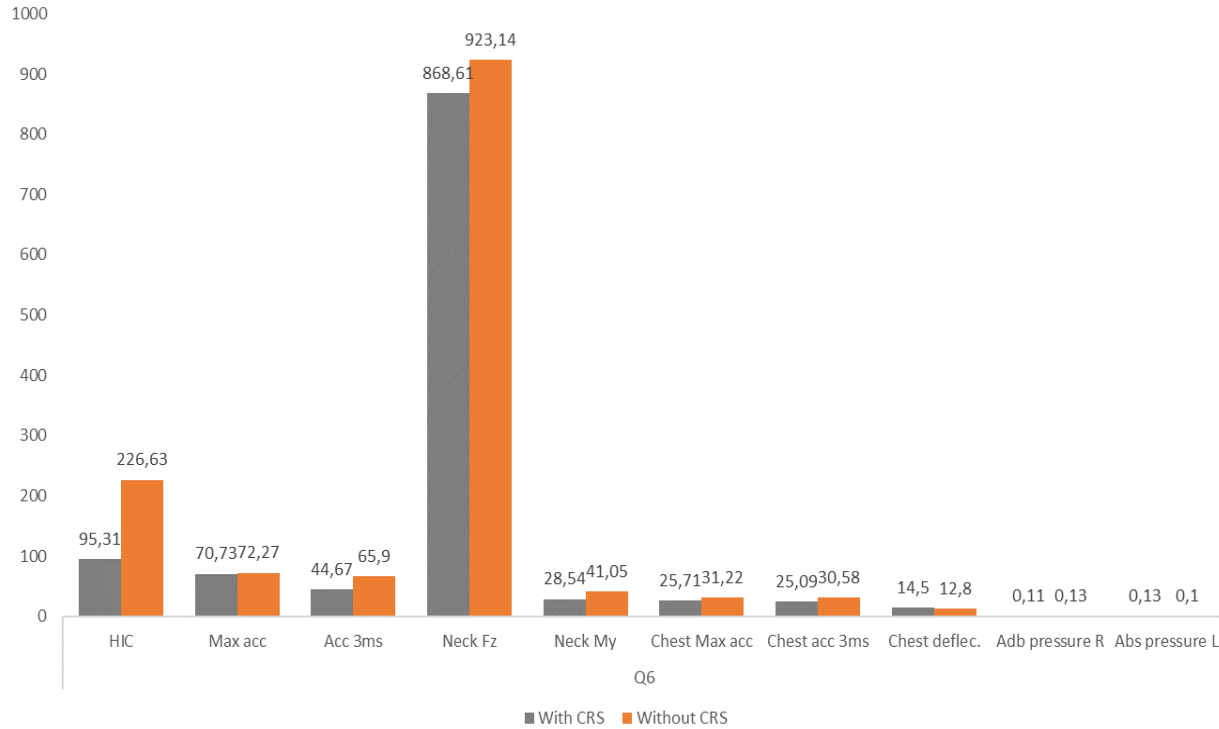
Abdomen Pressure Right:
0.14 bar at 98.7 ms
11.82 % of limit value 1.2

Abdominal Pressure Left:
0.23 bar at 106.5 ms
19.19 % of limit value 1.2



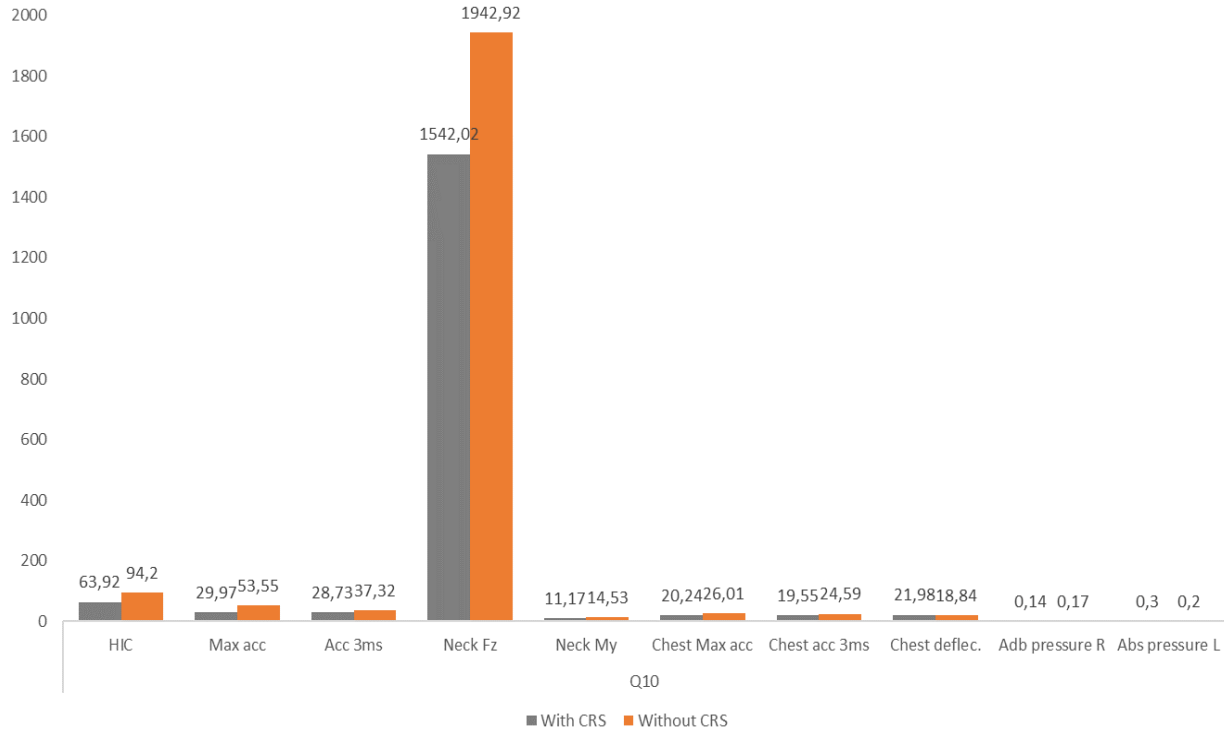
TESTS RESULTS Q 6 AND Q10

Q6 DUMMY COMPARISON



TESTS RESULTS Q 6 AND Q10

Q10 DUMMY COMPARISON



OPEN DISCUSSION



Notes





THANK YOU
FOR YOUR KIND ATTENTION



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