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Q6 Abdominal penetration

Tests results with different insert proposals

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Previous tests results from 2013

- Q6 used on the R129 test bench in R129 frontal impact
- With abdominal sensors
- Submarining checked with high speed camera
- 3 variations on dummy were tested :
  - Normal dummy
  - With silicone insert from IFFSTAR

  - With plastic “mickey” insert from DOREL.

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Previous tests results from 2013

Test configuration	With booster cushion	Abdominal pressure (max in bar)	Submarining
Normal Q6	No	0.5	No
	Yes	0.64	No
Q6 with Mickey insert	No	0.56	No
	Yes	0.32	No
Q6 with IFFSTAR insert	No	0.51	No
	Yes	0.35	No

No submarining and abdominal penetration.

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Previous tests results from 2013

Normal Q6

Q6 with “Mickey” insert from DOREL

Q6 with silicone IFFSTAR Insert

Results on test performed in 2014 / 2015

- Q6 used on the R129 test bench in R129 frontal impact
- With abdominal sensors
- Submarining checked with high speed camera
- Variations of the seat foam bench angle (normal & 5°)

- 3 variations on dummy were tested :
  - Normal dummy for reference
  - With silicone insert from DOREL

With plastic insert from Humanetics.

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Results on seat bench angle variation

Test configuration	With booster cushion	Abdominal pressure (max in bar)	Submarining
Normal Q6 Normal seat bench angle (15°)	No	0.61	No
Normal Q6 Modified seat bench angle (5°)	No	0.64	No

There is no submarining in all tests & no significant difference between both test configuration

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Results on seat bench angle variation

Normal Q6 with
standard test bench

Normal Q6 with 5°
test bench

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Results on dummy variation

Test configuration	With booster cushion	Abdominal pressure (max in bar)	Submarining
Normal Q6	No	0.61	No
Q6 with Silicone insert from DOREL	No	**1.21**	**Yes**
Q6 with plastic insert from HUMANETICS	No	0.83	No
Q6 with silicone Insert from DOREL & plastic insert from HUMANETICS	No	**1.64**	**Yes**

There is submarining with Silicone Insert & with Silicone insert + plastic insert
There is significant difference between some test configuration.

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Results on dummy variation

Normal Q6

Q6 with silicone insert from DOREL

Q6 with plastic insert from HUMANETICS

Q6 with Plastic & silicone insert

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Verification with booster seat in worst case

Test configuration	With booster cushion	Abdominal pressure (max in bar)	Submarining
Q6 with Silicone insert from DOREL	No	**1.21**	**Yes**
	Yes	0.45	No
Q6 with silicone Insert from DOREL & plastic insert from HUMANETICS	No	**1.64**	**Yes**
	Yes	0.38	No

There is no submarining & no abdominal pressure when the Q6 (with plastic and / or silicone insert) is placed in a booster seat.

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Summary

- There is no submarining & no abdominal pressure in the following case :
  - Normal Q6 on the normal test bench,
  - Normal Q6 on a modified test bench (5° angle seat),
  - Q6 with “mickey” insert form DOREL,
  - Q6 with silicone insert from IFFSTAR,
  - Q6 with plastic insert from HUMANETICS.

- But there is submarining & abdominal pressure in the following case :
  - Q6 with silicone insert from DOREL,
  - Q6 with silicone insert from DOREL and addition of plastic insert from HUMANETICS.

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Conclusion

- No need to change the R129 pulse & the R129 test bench
- An adapted insert (plastic or silicone) on the Q6 can change the kinematics of the dummies during the crash in order to have submarining & abdominal pressure.

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QUESTIONS?

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