

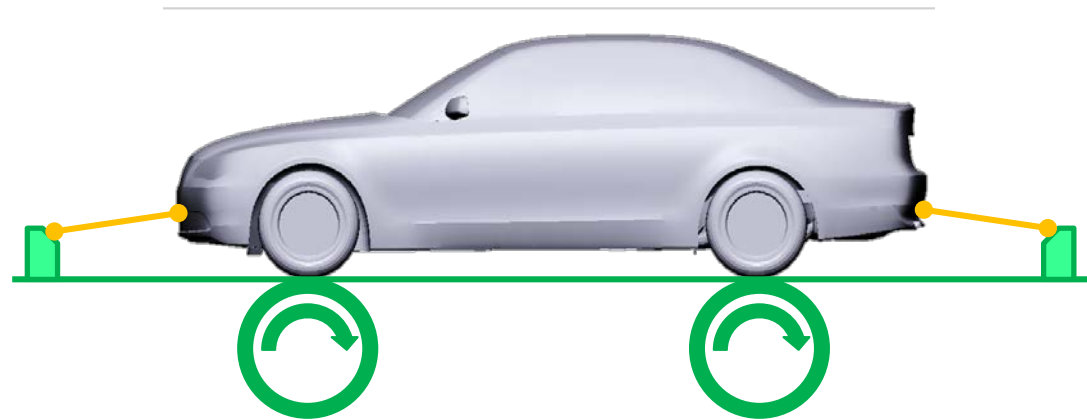
4WD dyno restraint

Methods

4WD RESTRAINT REQUIREMENTS

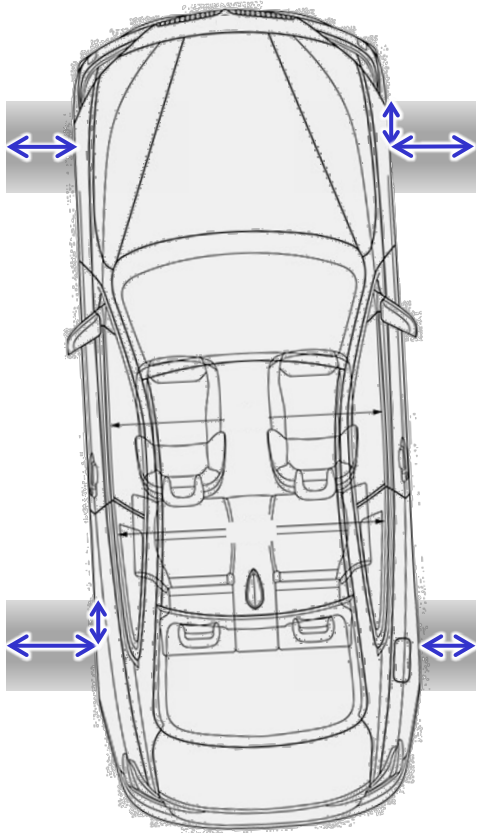
Introduction

- 4WD vehicles shall be tested on a dual-axis dynamometer (EU WLTP requirement and GTR CP option).
- This raised the issue of requirements for the restraining system.
- Several systems have been evaluated by Japan.



4WD RESTRAINT REQUIREMENTS

Position of the vehicle



Front and rear position:

Use existing definition.

Rotation / lateral position: Can both be checked by wheel position in y-direction.

Vehicle aligns itself if slowly dragged prior to final mounting.

Text proposal:

2.3.2.1.1. Rotational alignment (rotation round z-axis)

The vehicle shall be aligned within a tolerance of ± 1.0 degrees of rotation around the z-axis.

2.3.2.1.2. Lateral position (y-axis)

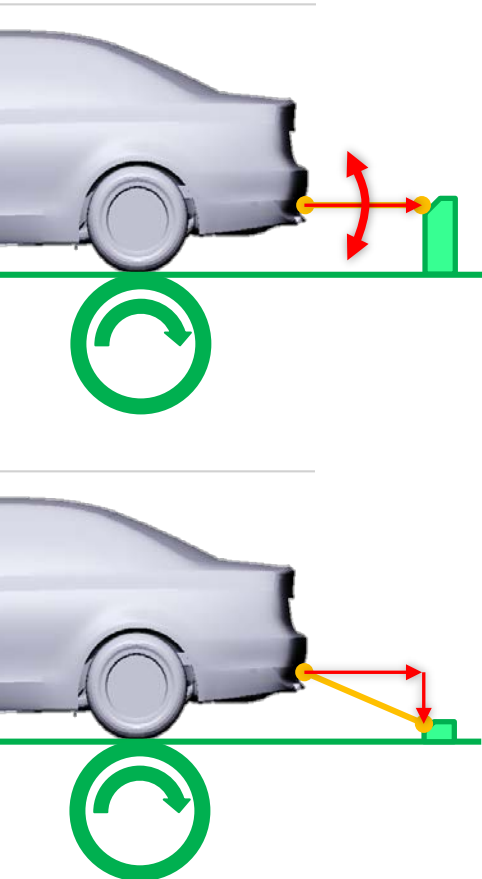
The vehicle shall remain aligned in the y-direction and lateral movement shall be minimised.

2.3.2.1.3. Front and rear position (x-axis)

Additional to the requirement of paragraph 2.3.2.1. of this annex, for all wheels the centre of the tyre's contact patch on the rollers shall be within ± 25 mm or ± 2 per cent of the roller diameter, whichever is smaller, from the top of the roller.

4WD RESTRAINT REQUIREMENTS

Force in z-direction



Force in z-direction:

Levels out, if identical between chassis dyno setting and test.

Can be zero (apart from weight of restraint system itself) for certain systems / mounting positions.

Stiffness: Required positioning shall remain during testing.

Text proposal:

2.3.2.2. Vertical force

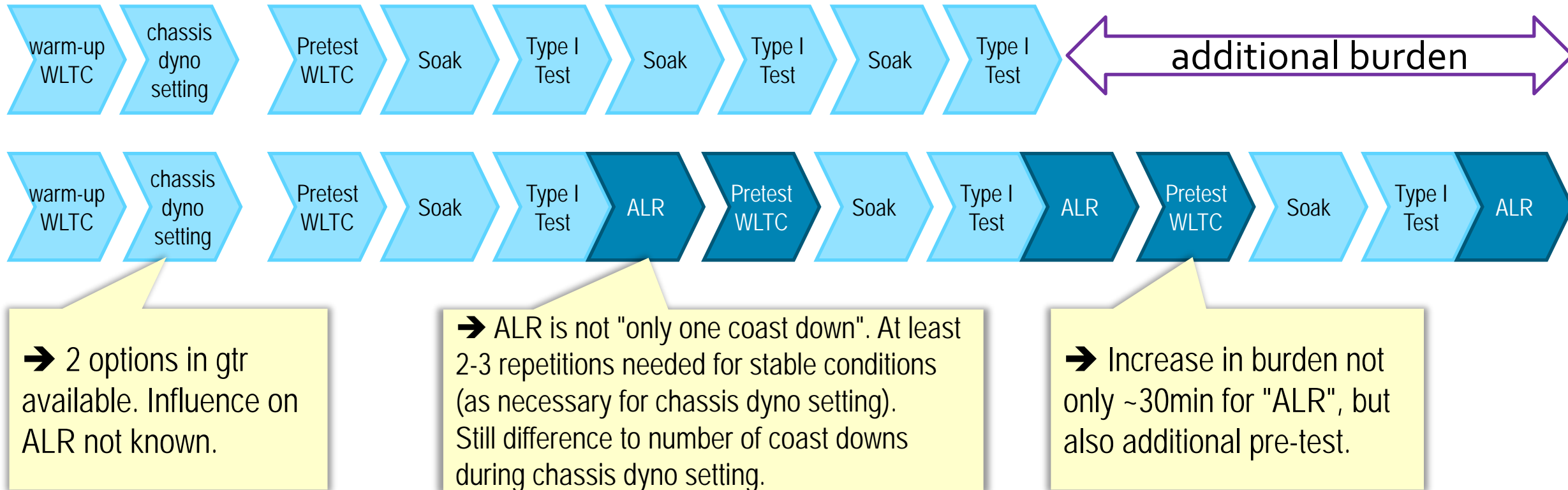
The restraint system shall be designed so that the vertical force imposed to the vehicle is the same during the chassis dynamometer setting and all tests. This criteria is fulfilled, if the effect on the chassis dynamometer load is below 10 Newton or if the restraint system is designed such, that it cannot impose any detrimental force.

2.3.2.3. Restraint stiffness

The restraint system shall exhibit sufficient stiffness in order to minimize any movements and rotations. Only limited movements along the z-axis and rotations over the y-axis are allowed to avoid detrimental effects towards the test results and to fulfil to the requirements of paragraph 2.3.2.2. of this Annex.

4WD RESTRAINT REQUIREMENTS

Analysis of "ALR" proposal ("quickcheck")



- Systems, that do not apply a detrimental force in z-direction do not need an "ALR" or "quickcheck".

4WD RESTRAINT REQUIREMENTS

Conclusion

- Applying a different force in z-direction between chassis dyno setting may influence the result (single- and dual-axis dyno).
- A dyno load check after the test may evaluate that, however the following issues should be considered:
 - there are remaining inaccuracies (load measurement system, different options of chassis dyno setting, number of coast downs).
 - restraint systems which do not apply any detrimental force should not be "punished" by additional burden.
- "ALR" / "quickcheck" should only be mandatory in the case of doubts about the influence on the force in z-direction.
- **But "ALR" / "quickcheck" is obsolete if the restraining systems physically does not impose any detrimental forces.**



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Thank you for
your attention

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