

APPLICATION OF STAR RATINGS TO VEHICLE MODEL VARIANTS

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Purpose

To set out the policy for applying published ratings to variants of a tested model of vehicle.

In brief

The criteria set out in Table 1 are applied by default, when assessing variants that differ from the tested variant of a vehicle model. Appendix A sets out the types of evidence that would need to be provided by manufacturers to support the rating of variants that do not meet the criteria in Table 1. Manufacturer's data cannot be used to *increase* the star rating of a variant.

Background

NCAP organisations usually test and rate one variant of a vehicle model. Other variants may differ from the tested vehicle in a number of ways. These *factors* include: body style, engine, transmission (including 4x4 vs 4x2), left or right-hand drive, mass and mass distribution and safety features. These can all be expected to influence the crash test results to some degree. Generally NCAPs do not make any claims or statements about non-tested variants.

"Stars on cars" programs, where NCAP ratings are displayed on vehicles in showrooms, can be limited by the lack of published ratings for some variants of a model. Furthermore, as more and more vehicles achieve top ratings, manufacturers are keen to have these ratings apply to other variants of the model.

To determine the star rating of variants, one option is for manufacturers to sponsor additional NCAP crash tests of these variants. However, to minimise this need and associated cost of doing so, it would be beneficial if there were agreed guidelines for identifying that a variant was equivalent to the tested vehicle for ANCAP rating purposes.

This document sets out ANCAP policy for these situations.

Criteria for applying ratings to other variants

The likely influence of key factors is considered in the following table, together with proposed criteria that should be met in order for the variant to receive the same rating as the tested variant. In some cases, the variant might receive a lower score and possibly a lower star rating than the tested variant.

Where any of the criteria in Table 1 are not met, *additional evidence* will be required as set out in Appendix A.

Table 1. Criteria for comparable occupant protection

Factor	Criterion
a) Body style (e.g. 3-door hatch, 5-door hatch, sedan, coupe, wagon)	<p>For the purpose of assessment a transverse vertical plane is defined that is 500mm rearward of the upper seat belt anchorage point for the driver seat. Forward of this plane variants must be identical in design and structure for crashworthiness purposes. A statement from the manufacturer is acceptable for this purpose, subject to visual verification. This includes the front seat belt anchorages but not rear seat belt anchorages.</p> <p>For example, a 3 door hatch result cannot be used for a 5 door hatch variant and vice-versa, without <i>additional evidence for all tests</i>. However, a sedan or wagon variant might be interchangeable with a 5 door hatch.</p>
b) Kerb mass	Variation up to $\pm 10\%$ is allowed.
c) Engine (displacement, cylinder configuration, aspiration, block size, type of fuel)	<p>The same block size & configuration is allowed, irrespective of displacement, aspiration and fuel. Extra components within the engine bay such as LPG convertors and turbo-chargers are acceptable provided that footwell and pedal intrusion are well controlled in the tested vehicle (i.e. 4 points scored for driver's feet - this means that pedal rearward displacement is under 100mm and there is no footwell rupture).</p> <p>Note that a 4 cylinder result cannot be used for a V6 result and a V6 result cannot be used for a V8, and vice versa, without <i>additional evidence for the offset test</i>.</p> <p>Engine differences are acceptable for the side impact and pole tests.</p> <p>For the pedestrian protection rating, components that reduce the bonnet clearance and/or stiffness of a bonnet impact will be assessed. Extra head impact tests might be undertaken at ANCAP's discretion.</p>
d) Transmission (manual or	Any transmission is acceptable. Note that ANCAP policy for selection of test vehicles is that an automatic transmission will only be selected if at least 80% of that variant sales are automatic.

auto, number of gears)	
e) Driven wheels (4x4, 4x2, front-wheel drive, rear wheel drive)	<p>Two wheel drive results (either front or rear) are not interchangeable with an all-wheel-drive variant without <i>additional evidence (offset test)</i> due to the effect of the rear driveline. Similarly front-wheel drive results are not interchangeable with rear-wheel-drive results, without additional evidence.</p> <p>Driven wheel differences are acceptable for the side impact and pole tests.</p>
f) Ride height (eg height of top of wheel arch) and tyre diameter	<p><i>Offset test</i> acceptable provided that the ride height does not vary by more than +/-50mm from the tested variant. <i>Side impact test</i> of lowest variant may be used for other variants. Higher variants require <i>additional evidence</i> for the <i>side impact test</i>, unless they become a high-seat vehicle*.</p>
g) Wheelbase	<p>Wheelbase variation up to ±100mm is acceptable.</p>
h) Driver location (left-hand-drive, right-hand drive)	<p>Where ANCAP has published a rating based on crash tests of a left-hand-drive variant, that rating may be applied to other variants in Australasia subject to meeting the relevant criteria in this table.</p>
i) Front occupant restraint systems	<p>Subject to items j to m, installed airbags must be the same as the tested variant, or better. For example, for the purpose of the side impact test, curtains may be fitted where the tested variant had seat-mounted side airbags with head protection. However, <i>additional evidence</i> is required for the pole test, where the type of head-protecting side airbag is different.</p> <p>Front seat belt pretensioners and load limiters must be identical.</p> <p>Front seat belt anchorages must be identical in geometry and adjustment features.</p> <p>Seat design must have similar restraint-related features, such as anti-submarining pans. Upholstery and adjustment features may vary.</p>
j) Lack of passenger front airbag	<p><i>Offset test</i> results for a variant with a front passenger airbag may be used for a variant without a front passenger airbag but a score deduction normally applies. Where a Euro NCAP tested variant had a front passenger airbag and the variant being assessed does not have this then a 2-point deduction is applied to the front passenger head score (<i>offset test</i>), unless <i>additional evidence</i> is provided (new policy).</p>

k) Lack of head-protecting side airbag (not high seat vehicle*)	Where a tested variant had a head-protecting side airbag and the variant being assessed does not have this then a 2-point deduction is applied to the head score (<i>side impact test</i>), unless <i>additional evidence</i> is provided (new policy). Test data from an acceptable ADR72 crash test would be suitable for this purpose.
l) Lack of thorax-protecting side airbag (not high seat vehicle*)	Where a tested variant had a thorax-protecting side airbag and the variant being assessed does not have this then a 2-point deduction is applied to the chest score (<i>side impact test</i>), unless <i>additional evidence</i> is provided (new policy). Acceptable ADR72 test data would be suitable for this purpose but 2-point deduction applies where these data do not include dummy backplate or T12 measurements.
m) Lack of knee airbag	Where a tested variant had a knee airbag and the variant being assessed does not have this feature available then a 2 point deduction is applied to the driver/passenger upper leg score (<i>offset test</i>) unless <i>additional evidence</i> is provided (existing ANCAP policy).
n) Other safety features	<p>Intelligent seat belt reminders are assessed and scored for each variant. Therefore variants with different numbers of seat belt reminders will have different scores.</p> <p>ESC is required for a 5 star rating. Variants that miss out on 5-star due to a lack of ESC can only obtain a maximum 4-star rating (overall score 32.49 points). Similar arrangements will apply if ANCAP introduces additional qualifiers for a star rating.</p> <p>In the case of station wagons and vans that are car derivatives, a 5-star rating will only be available where that variant has a cargo barrier (standard or optional equipment) that complies with AS 3034 (or acceptable equivalent).</p>

* "High seat vehicle" is a vehicle with a seating reference height more than 700mm and so is exempt from the ADR72 side impact test. ANCAP applies a default 16 points for these vehicles, unless a Euro NCAP test result is available that is less than 16 points.

Refer to the *ANCAP Notes on the Assessment Protocol* for more information about the rating system.

APPENDIX A

Additional evidence to be provided by the vehicle manufacturer, where indicated in Table 1

The manufacturer's submission should address each of the technical items set out in Table 1, indicating whether the criteria are met.

Where a manufacturer seeks to apply an ANCAP rating to a variant that does not meet the criteria set out in Table 1, further engineering evidence is required to show that the additional variant provides at least the same level of occupant protection as the tested variant for the type of crash test under consideration.

Additional evidence may also be submitted where ANCAP proposed to use default deductions due to a lack of side airbags (j & m in Table 1).

Manufacturers may also submit evidence to show that an ANCAP rating should not be applied to a particular variant, despite it meeting the criteria of Table 1.

Submissions from manufacturers will be circulated within the ANCAP Technical Working Group on a confidential basis.

Crash performance comparisons

The main purpose of the test data is to show comparable performance so that the existing ANCAP test results can be applied to the additional variant or to show that the additional variant performs better than that derived from a default score (e.g. where ANCAP proposes to apply a 2-point deduction due to the absence of airbags). Manufacturer's test data is not acceptable for deriving a *higher* star rating for an additional variant - only ANCAP or other acceptable NCAP test data may be used for this purpose.

Acceptable engineering comparisons include:

- a) Crash tests for related regulation compliance tests, at regulation speeds or higher (such as ADR72 and ADR73)
- b) Crash tests at NCAP speeds conducted according to ANCAP/Euro NCAP protocols by or on behalf of the manufacturer at an approved test facility (e.g. acceptable for ADR certification purposes)
- c) An FMVSS 214 Oblique Pole Test may be used to demonstrate the effectiveness of a head-protecting side airbag/curtain, as an alternative to a Euro NCAP-style pole test.
- d) Results of computer modelling should show comparable structural deformation (including footwell and firewall) and vehicle body deceleration. MADYMO modelling, or equivalent, of dummy responses is preferred.

The tested models should be built to Australian specifications, but overseas specifications (e.g. comparisons between two LHD variants) may be acceptable.

Manufacturer's representatives are encouraged to contact the ANCAP Technical Manager to discuss the types of evidence that are proposed to be submitted. In general only summary test data, that identifies the vehicle, the type of test, the test facility and the key injury measurements, is required by ANCAP.

Crash test comparisons

Where crash tests are compared the injury values for the additional variant should not exceed 110% of those in the ANCAP-tested variant unless:

- a) the resulting injury scores are in the good range (i.e. score 4 points under the ANCAP assessment protocol) or
- b) the resulting crash test and overall scores for the variant are sufficient to retain the same star rating as the tested variant

Covering letter from company management

It will also be necessary for a covering letter, signed by a senior company representative, to be submitted confirming that the submitted data is accurate and seeking an ANCAP rating of the variant. This is necessary so that ANCAP has traceable evidence of the reason for assigning a star rating without crash testing the variant.

Example letter:

Addressed to Nicholas Clarke, Secretary, ANCAP

PO Box 4041, Manuka ACT 2603

...

This letter confirms the technical advice provided to ANCAP by Mr XXX from our company. I can confirm that

- a) ADR 72 and 73 crash test data for the XX variant(s) of the XX were used for ADR certification of the XX variant. No equivalent crash test results are available for the XX variant as it was not necessary for ADR certification purposes.
- b) The structure and restraint systems relevant to front seat occupant protection are comparable for ANCAP frontal offset, side impact and pole impact crash tests

It is requested that ANCAP issues ratings for the XX variant(s) based on the ANCAP rating of the XX variant

Yours...

(signed by a senior company representative in Australia)