CR Road Test Insights: Methodology
April 2019

Overall CR Road Test Score
Road test scores are determined by factoring together CR's many test results including empirical measurements as well as expert evaluations. Road test scores are one of the main components of CR's overall score used in vehicle rankings along with predicted reliability and predicted owner satisfaction from CR's surveys. The fourth component reflects safety factors: IIHS and NHTSA crash-test results, the availability of advanced safety systems and whether a vehicle's gear selector logic lacks fail-safes.

ACCELERATION: Overall Acceleration
Acceleration times are measured for 0-30 mph, 0-60 mph, 45-65 mph, quarter mile time, and speed at quarter mile, and also in metric units. Acceleration tests are conducted on a smooth, dry, flat straightaway at CR's test track. Time, speed, and distance measurements are taken with a precise GPS-based device. The results reflect the average of four runs-two in either direction. Tests are performed from full stop (other than 45-65 mph) and begin when the sensors detect any movement. The tests are performed to represent consumer driving behaviors rather than achieving the quickest acceleration. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: 0-30 mph, 0-60 mph, quarter mile sec, quarter mile mph

BRAKING: Overall Braking
Braking tests are performed on a section of the track that is monitored for consistency in coefficient of friction. Tests are performed on both dry and wet pavement from 60 mph to a complete stop. Testing is conducted based on an SAE braking test procedure and includes a series of stops punctuated by a one-mile cooling lap. Prior to testing, a brake-burnishing procedure is performed. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: Dry Stopping Distance, Wet Stopping Distance, Brake Modulation

CLIMATE SYSTEM: Overall Climate System
The climate score is mostly based on the features on our test vehicle. Features such as heated seats, multiple-zones, and automatic climate control increase the score. Lack of vents to the rear, or overly poor performance are deductions. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).
COMBINED FUEL ECONOMY / ENERGY EFFICIENCY: Overall Fuel Economy/Energy Efficiency
Applies only to electric vehicles and plug-in hybrids tested since 2017. For plug-in hybrids, a composite consumption test that reflects MPGe in charge-depleting mode and CR's MPG measurement in charge-sustaining mode. The electric consumption portion represents the vehicle's ability to cover 50 miles on electric power alone. Example: If a PHEV covers 40 miles on electric, its electric consumption (EPA's MPGe) accounts for 80% of the composite. CR's overall MPG (weighted average of city and highway) in charge sustaining represents the gas consumption portion. The energy consumption figures of pure electric vehicles are based on the EPA's estimation of MPGe. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: City Mileage (mpge), Highway Mileage (mpge), Overall Mileage (mpge)

DRIVING POSITION: Overall Driving Position
An evaluation of the relation between the driver's seat, pedals, steering wheel, armrests and center console for short, medium-sized and tall evaluators. Factors also include seat and steering wheel range of adjustments. Evaluations are performed on armrest height, steering wheel placement and potential space intrusions. The evaluation includes outward visibility, taking into account obstructions or lack thereof due to roof pillars, size of glass area and blind spots, and seating position in relation to the reach of pedals and controls. Tests are performed in real-life driving situations and take into account road visibility, surroundings and changing lanes. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: Driving Position for Short, Medium and Tall Drivers; Driving Visibility for Short Medium and Tall Drivers
EMERGENCY HANDLING: Overall Emergency Handling
A composite that reflects avoidance maneuver speed and driver confidence through it, as well as how the vehicle behaves when pushed to its cornering limits around CR's handling circuit. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: Avoidance Speed, Steering Feel, Controllability, Avoidance Confidence

Avoidance Speed
A measurement of the highest speed a vehicle can achieve while successfully performing the avoidance maneuver. Each car is tested by two drivers. Avoidance maneuver speed reflects the average.

Steering Feel
During on-limit handling, a jury evaluation of how well the steering communicates level of tire grip, pavement texture and cues regarding impending loss of the intended cornering line, without excessive steering kickback.

Controllability
During on-limit handling, a jury evaluation of how balanced the vehicle is between understeer, oversteer and, in turn, how forgiving and predictable the vehicle is if drivers misjudge a corner (entering a corner at a higher speed than realized).

Avoidance Confidence
In addition to avoidance speed, an evaluation of how confidence-inspiring the vehicle is regarding transient response, cornering balance and roll rate. This test is also a measure of whether stability control is well-calibrated. Each car is tested by two drivers. Score is the average of the two individual judgments.

ENERGY RANGE AND FEATURES: Overall Energy Range & Features
Applies only to electric vehicles and plug-in hybrids. A CR measurement of EV and PHEV electric driving range in miles when driven at 65 mph in a temperature window of between 60 and 80 F. Test starts with a full battery. Car gets unplugged before start of test. End of test is when propulsion power is reduced. Also includes extra credit or penalty as a function of charging times and ability to fast charge. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: Range, Features

FIT & FINISH: Overall Fit & Finish
An evaluation of the interior quality and craftsmanship, including the quality of materials, noting soft-touch surfaces, stitching details and tactile feel of switchgear. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: Primary Cockpit, Other Cockpit, Interior Fabric, Trunk

Primary Cockpit
An evaluation of the fit and finish of the doors, dash, steering wheel and column and switchgear.

Other Cockpit
An evaluation of the fit and finish of the glove box, cubbies, center console, cup holders, headliner and visors.

Interior Fabric
An evaluation of interior fabric of the seats and carpet.

Trunk
An evaluation of the fit and finish of the trunk or cargo area.
FRONT ACCESS: Overall Front Access
An evaluation of ingress and egress to the driver’s seat for short, medium-sized and tall evaluators. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: Front Access for Short, Medium and Tall Drivers

FRONT SEAT COMFORT: Overall Front Seat Comfort
An evaluation of front seat comfort and support noting thigh, lower back support and whether or not side bolsters are effective or too constricting for short, medium-sized and tall evaluators. Typically, higher foam density and a more taut seating surface (leather vs. cloth) help long-term support. A 4-way lumbar adjustment often helps with lower back support. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: Front Seat Comfort for Short, Medium and Tall Drivers

FUEL ECONOMY: Overall Fuel Economy
A measurement of CR’s city and highway fuel consumption tests conducted on the same routes, by the same drivers, at the same speeds, based on actual CCs of fuel consumed by the engine. Tests performed on a prescribed city course and highway cruising at a constant 65 mph. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: City Mileage (mpg), Highway Mileage (mpg), Overall Mileage (mpg)

City Mileage (mpg)
A measurement of CR’s city fuel consumption tests conducted on CR’s track following predetermined speeds at specific locations with set idle time. The test is time-bound and performed by the same drivers. Each car is driven by two drivers with four runs per driver. Result is based on actual CCs of fuel consumed by the engine.

Highway Mileage (mpg)
A measurement of CR’s highway fuel consumption tests conducted on a specific section of five miles on Connecticut Route 2. The test is time-bound and is performed in both east- and west-bound directions. Cars are driven at a constant 65 mph. Each car is driven by two drivers with four runs per driver. Result is the average of those eight runs.

Overall Mileage (mpg)
A composite of the results of CR’s city and highway fuel consumption tests conducted on the same routes, by the same drivers, at the same speeds, based on actual CCs of fuel consumed by the engine. Tests performed on a prescribed city course and highway cruising at a constant 65 mph.
**HEADLIGHTS: Overall Headlights**
An evaluation of low and high beams to see how well they illuminate the road ahead. The base score takes into account the number of visible signs for both low and high beams combined with an evaluation of the low beam's brightness and pattern's width. Deductions are taken for glare, the sharpness of the low-beam cutoff and any non-uniformity of the light pattern. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

**Individual Tests: High Beams, Low Beams, Width, Intensity**

**High Beams, Low Beams**
An evaluation of how well testers can see a series of black signs that simulate objects ahead and to the sides of the road. After headlights are aligned, tests are performed from a stationary vehicle on CR's track on clear moonless nights. The number of visible signs and the distance are noted.

**Width**
An evaluation of the width pattern in low beams.

**Intensity**
An evaluation of the brightness/intensity of headlight beams.

**NOISE: Overall Noise**
A jury evaluation of the vehicle's interior noise level in everyday driving focusing on quantitative and qualitative noise emanating from engine, road/tire and wind. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

**REAR ACCESS: Overall Rear Access**
An evaluation of ingress and egress to the rear seat for short, medium-sized and tall evaluators, noting the amount of ducking or climbing required, foot path, door opening angle, C-pillar and/or door sill intrusion. The front seat is set for the 40" position (95th percentile of population). *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

**Individual Tests: Rear Access for Short, Medium and Tall Drivers**

**RIDE: Overall Ride**
A jury evaluation of how the vehicle's suspension isolates and absorbs road imperfections and how steady it keeps the body on various road surfaces. The test reflects how comfortable the ride is.
*Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).
ROUTINE HANDLING: Overall Routine Handling
A jury evaluation of the car's agility in corners conducted on public roads and based on body control, body lean, steering response and feedback. Also includes sporty driving judgment: a jury evaluation of the vehicle's performance in the zone between routine handling and on-limit handling. This judgment is designed to highlight cars that possess athletic reflexes that come into play during a spirited drive, and is performed on CR's track. Routine Handling also incorporates turning circle: a measurement of diameter in feet of the vehicle's tightest possible turning circle, i.e., the bumper clearance needed to make a complete U-turn. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: Turning Circle, Routine Handling, Sporty Driving

Routine Handling: This portion of overall routine handling is done on public roads in normal driving situations. To achieve a top score, excellent steering feel, and feedback is necessary. Vehicles that struggle with broken or uneven surfaces will receive a lower score.

Sporty Driving: To get a top score in sporty driving, the vehicle should provide confidence to the driver even when driven quickly. A vehicle that has good steering feel, feedback, easy to control, feels balanced and minimal/controlled body lean will excel in this test.

THIRD ACCESS: Overall Third Access
An evaluation of ingress and egress to the third seat, where applicable, noting the footpath, ease of sliding and/or finding the lever that slides a section of the third row seat and how much human body contortion is required, for short, medium-sized and tall evaluators. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

Individual Tests: Third Access for Short, Medium and Tall Drivers

THIRD SEAT COMFORT: Overall Third Seat Comfort
An evaluation of the third seat's outboard positions. The second seat is allowed to slide forward a notch if it has the ability. Tall and medium-sized evaluators rate comfort based on toe, knee and head room as well as thigh support and posture. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

THIRD ROW SEAT: Overall Third Row Seat
A calculation of extra credit for third row seating by combining comfort, access and adult seating capacity for third row seats. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

TRANSMISSION: Overall Transmission
A jury evaluation of shifting smoothness and response, shifter action, clutch actuation, timeliness of downshifts and nature of power delivery based on the coordination between throttle input, engine, transmission and terrain. For manual transmission equipped cars, aspects such as shifter and clutch action are considered. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).
**TRUNK / CARGO: Overall Trunk/Cargo**
For sedans: A measurement that consists of the number of suitcases (24" rollers) plus the number of duffel bags that fill the trunk completely. Suitcases are first placed into trunk until no additional pieces can fit. Then the smaller duffel bags are placed one-by-one until no additional bags can be placed. Example: "3+1" means 3 roller suitcases and 1 small duffel bag. For SUVs, minivans and wagons: a volume measurement (in cubic feet) of the maximum size of CR’s expandable pipe frame box that can slide in and out of the cargo area with the rear seats folded and with the ability to close the rear gate. *Overall test score combines individual results and is mapped to a uniform scale (0.5 - 5.5).

**Individual Tests: Trunk Space, Cargo Volume**

**USABILITY: Overall Usability**
This test is formerly known as 'Controls & Displays'. An evaluation of how intuitive the controls are including infotainment systems, lights, mirrors, windows, climate and seat controls, switches or knobs. Evaluators look for well-labeled controls, least amount of distraction, reachability, unintended responses, clarity, placement and ease of use.