

Car Range with Bike Racks: AVILOO Debunks Myths and Delivers Facts

New Study Shows: Rear-Mounted Loads Are Significantly More Efficient Than Roof-Mounted – Minimal Speed Adjustment Is Enough to Maintain Range

Wiener Neudorf, April 15th, 2025: The driving range of electric vehicles continues to be a heavily debated topic - especially when additional loads like bike or ski racks come into play. Many EV owners wonder: How much does a loaded rack actually affect my vehicle's efficiency? AVILOO, the specialist in EV battery diagnostics, now provides the answers. AVILOO's battery test software for used EVs and plug-in hybrids is considered the global industry standard for independently determining State-of-Health (SoH), remaining capacity, and potential battery defects.

Study of Different Scenarios

As part of a thoroughly planned case study, AVILOO analyzed the energy consumption of an electric VW ID.4 SUV under real but controlled conditions on the A2 motorway south of Vienna. Three scenarios were tested: one without any carrier, one with a loaded roof rack, and one with a loaded rear-mounted rack. The load consisted of three 28-inch trekking bikes.

Each configuration was tested at night (to avoid traffic influence) over a fixed 60-kilometer round-trip route on the a.m. highway.

The following fixed test parameters, self-influenced variables, and external conditions were consistently maintained and considered: constant speed (via cruise control), tire pressure, summer tires, no air conditioning or heating, closed windows, dry road surface, and wind speed under 15 km/h. These unchanging baseline conditions ensured meaningful and reproducible measurements.

The results speak for themselves - surprising and reassuring insights

It goes without saying that the rides without any load or rack had the lowest kWh consumption per 100 km. What stands out is the significant difference in consumption between the loaded scenarios, which becomes increasingly noticeable at higher speeds. The small difference between the curve for the unloaded car (blue) and the curve for the test with the loaded rear rack (orange) is impressive (chart 1).

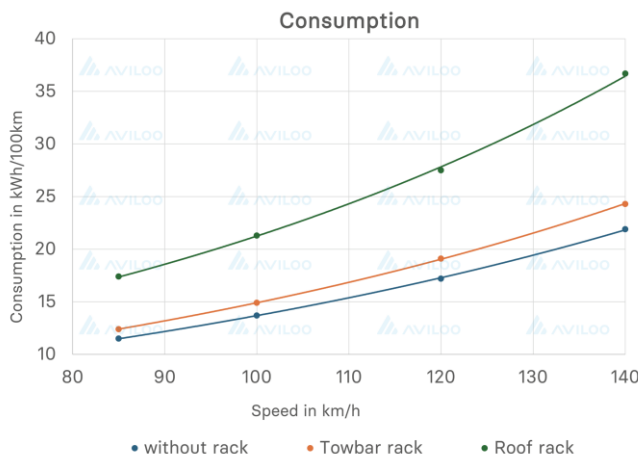


Chart 1

The roof rack is the biggest range killer.

Someone accustomed to driving at 130 km/h would need to reduce their speed by a full 33 km/h to 97 km/h to achieve the same consumption level as when driving without any load (chart 2).

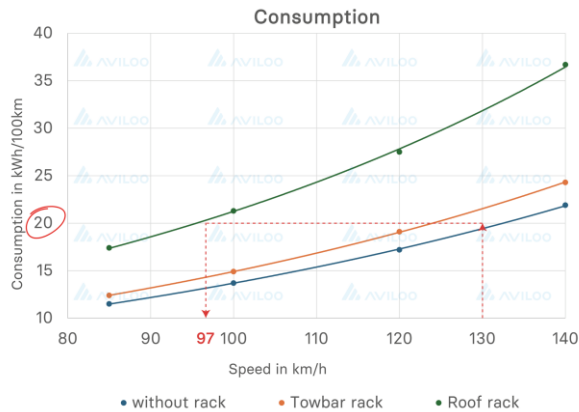


Chart 2

The rear-mounted rack, on the other hand, is extremely efficient.

The required speed reduction is just 7 km/h - barely noticeable. This means that driving habits can essentially remain unchanged when using a rear-mounted rack (chart 3).

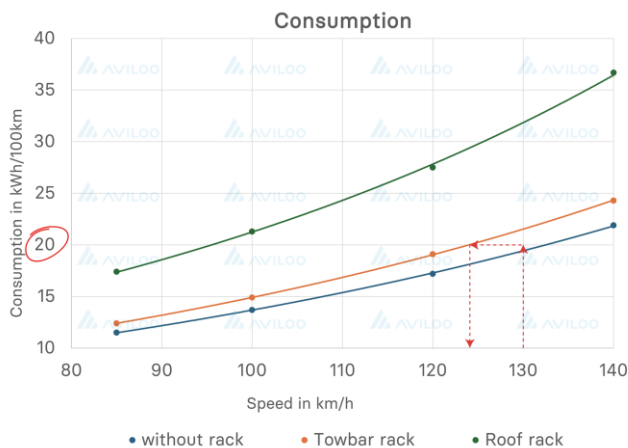


Chart 3

“We want to bring clarity with our study,” explains Nikolaus Mayerhofer, CTO of AVILOO and test driver for all test rounds. “There are many half-truths about extra consumption due to loading. Our measurements clearly show that rear-mounted racks have minimal impact on range and driving behaviour. Roof loads, however, result in noticeable losses. The main physical reason for the clear differences is air resistance - it doesn’t increase linearly but quadratically. At double the speed, air resistance increases energy use fourfold.”

**AVILOO's Recommendation:**

All EV drivers traveling with sports or leisure equipment should consistently opt for rear-mounted racks. This not only saves energy but also allows for familiar travel routines without extra charging stops or inconvenient route changes.

About AVILOO

The company is the global market leader in battery diagnostics for electric and plug-in hybrid vehicles. It develops and markets precise, fast, and manufacturer-independent tests to detect the SoH (State of Health) and defects of drive batteries in used vehicles. The test results are available as detailed reports and certificates. All analysis methods and certificates are TÜV and CARA certified, ensuring absolute transparency and safety for used vehicle buyers, sellers, and users (commercial and private). The fastest comprehensive diagnostic solution currently on the global market is the AVILOO FLASH Test, which can be cost-effectively and easily performed on a vehicle in just three minutes. AVILOO currently covers 95% of all available brands.

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