Tow Vehicle Tips to Know Before You Tow

By Mark J. Polk, RV Education 101

Towing a trailer is a confusing topic and the confusion starts with the tow vehicle. There are vehicle weight ratings, tow packages, tow capacities, axle ratios, auxiliary braking and more to worry and learn about. The bottom line is you want to be safe when you tow a trailer, and understanding your tow vehicle is the first step.

If you already own a tow vehicle my goal with this article is to help you identify what the vehicle's capabilities are so you don't try to tow more than it can safely tow. If you don't already own a vehicle my goal is to point out some important items to look for in a tow vehicle prior to buying it.

Let's start with a few vehicle weight terms you should be familiar with:

Gross Vehicle Weight Rating (GVWR): Both the tow vehicle and the trailer have a GVWR. This is a rating, not to be exceeded. It is the maximum amount of weight the axles and other components on the tow vehicle or trailer can support before something in the towing system is overloaded. You never want to exceed any weight rating.

Curb Weight (CW): This is the actual weight of the tow vehicle. It includes all fluids and a full fuel tank, but it does not include the weight of the driver, any passengers, optional equipment, aftermarket installed equipment, or cargo you add to the tow vehicle.

Gross Axle Weight Rating (GAWR): This is the maximum amount of weight an axle can support. If you overload an axle you are overloading one or more components of that axle. This usually results in exceeding the GVWR as well.

Net Payload (NP): This is the amount of weight that can be put in or on the truck after you subtract the weight of the driver, passengers and any optional or aftermarket equipment.

Gross Combined Weight Rating (GCWR): This is an important weight rating that is often times overlooked. The GCWR is the maximum permissible weight of the tow vehicle and trailer combined, when both are fully loaded for travel.

Tow Rating: The tow rating or tow capacity is the maximum amount of weight a particular vehicle is rated to tow. It's important you look at any footnotes in towing guides to make sure the vehicle has the proper equipment for a particular advertised tow rating.

With some basic terminology out of the way it's important to understand that every component in a towing system, and every component on the tow vehicle has a weight rating. The vehicle's towing capacity is based on a combination of these various weight ratings. The tires have load ratings, axles have weight ratings, the hitch receiver has a weight rating and so on.

There are lots of factors involved in calculating a tow rating, but for a general idea of what the tow rating is take the tow vehicle's GCWR and subtract the fully loaded tow vehicle's scaled weight. The difference is the maximum weight of the trailer you can tow. Keep in mind it's not good to max out the tow vehicle's capabilities

The only way to know the real tow rating for a vehicle is to know how it was equipped from the vehicle manufacturer. What I mean is you need to know the year, make, model, body configuration, engine, transmission, axle ratio, if it has a tow package and if it is 2-wheel-drive, 4-wheel-drive or all-wheel-drive. If it's a new vehicle you can get this information from the window sticker. If it's a used vehicle it will take some investigative research. Sometimes it's possible to do a VIN search on the Internet to narrow down how it was equipped from the factory. The reason this is so important is because you can take two identical vehicles that are the same year, make, model, engine size, and transmission with the only difference being the rear axle ratio and there can be thousands of pounds difference in tow ratings. It is extremely important you know how the vehicle you own or purchase is equipped for towing. If you look closely at a towing guide you will notice small foot notes that explain what equipment is required for a vehicle to have a specific tow rating. Unfortunately not all truck and RV salespeople understand this, so it is our job to make sure we know how the vehicle is equipped.

Let's go over some basic terms and equipment commonly found on tow vehicles:

Axle Ratio: The rear axle is also referred to as the differential or final drive. The axle is what actually makes the vehicle move. The vehicle's engine creates power and torque but you need to get that power to the wheels. To do that the power from the engine goes to the transmission and from there back to the differential or axle. Inside the axle gears multiply the power and send it to the drive wheels, making the vehicle move. When a manufacturer builds a vehicle they offer different axle ratios for different driving situations. There are axles that are good for fuel economy and there are axles that are good for towing. It's really important to select the right axle ratio for the job, especially if you plan to tow. The axle ratio is a comparison of how many times the drive shaft rotates, versus the rear wheels. A 4.10:1 axle ratio means the drive shaft or pinion gear rotates 4.1 turns for each rotation of the tires or ring gear. Axles with higher numeric values are better suited for towing.

What is torque: A simple definition for torque is the force it takes to turn something. Think about changing a tire. If you use a long breaker bar you have more mechanical advantage or torque to loosen or tighten the lug nuts. If you use a shorter bar you have less mechanical advantage or torque to do the job. The rear axle on a vehicle is similar to this. If you use a lower set of gears for towing (high numeric value) it gives you more mechanical advantage sending more torque or force to the drive wheels.

Front-Wheel-Drive: FWD vehicles use a transaxle to make the front tires the drive tires. A transaxle basically combines a transmission and axle into one unit. Front wheel drive vehicles provide good traction, but are not well suited for towing trailers, especially heavy loads. When you load the trailer's tongue weight on the vehicle you can lose traction on the front drive wheels.

Two- Wheel-Drive: 2WD drive means that two of the four wheels on the vehicle are used to the move or drive the vehicle. For many years most 2WD drive vehicles used the rear wheels as the drive wheels, but today there are lots of front wheel drive vehicles too. Any 2WD vehicle used for towing a trailer should be rear-wheel-drive.

Four-Wheel-Drive: 4WD is used to provide additional traction to the vehicle's front tires. It is really only designed for use when driving conditions prevent good traction, like in snow or sand, and you need the front wheels as well as the rear wheels to provide increased traction. My simple rule is, 4WD should be only be used for off-road conditions, or only use 4WD when the tires lose traction. It might be in snow, sand, loose dirt or general off-road driving conditions. As for towing you might need to use 4WD if you are on a loose road surface like gravel while going up a grade. Never use 4WD at highway speeds on solid road surfaces.

All-Wheel-Drive: AWD means all four wheels on the vehicle are drive wheels. Some AWD vehicles are full time AWD and some are part time AWD. It's important you check individual manufacturers for what type AWD system the vehicle has. Typically AWD sends power to the wheels with the most traction for the best handling on the road. AWD is used on SUVs and on some sports cars.

What do transmission gear symbols Drive, 1, 2 &3 mean: A vehicle's transmission is made up of different sets of gears that allow the vehicle to drive down the road at different speeds. Think about an old pick-up truck with a manual transmission. You start out in first gear and when you gain speed you need to shift to second gear to make the truck go faster. If you stay in first gear the truck would only go only go about 20 mph and the RPMs would be really high. The drive position on an automatic transmission is the final gear that optimizes cruising speed, RPMs and fuel economy.

Overdrive: When I was young vehicles came equipped with three-speed transmissions. They had first gear, second gear and drive. If you ever drove one of those vehicles it always sounded like it needed to shift one more time, like the RPMs were up revving too high. Eventually auto manufacturers started using an overdrive gear to help decrease the engines RPMs at cruising speeds. Overdrive transmissions reduced engine speed, improved fuel economy and there was less wear and tear on the engine and transmission. Today the term overdrive basically means anytime a higher gear is used for better cruising speeds and fuel economy.

Tow Haul Mode: Today's auto manufacturers are pressured to develop and use technology that will increase fuel economy across their entire fleet of vehicles. One way they do this is by adding more gears in transmissions to help reduce engine RPMs, which in turn improves fuel economy. The problem is a six or eight speed transmission, designed for fuel economy, is not necessarily good for towing heavy loads. To help solve the towing problem manufacturers include transmission modes commonly referred to as tow/haul mode. A transmission tow/haul mode basically changes the shift points in the transmission. It lets the transmission shift at higher RPMs and it increases the time between shifts to help get heavier loads, like a trailer, moving down the road. Every vehicle manufacturer is a little different when it comes to tow/haul modes. Some tow haul modes disengage the higher cruising range in the transmission, like overdrive, to help prevent damage to the transmission. It's important you read your owner's manual to understand how these transmission modes work on your vehicle.

What gear should your tow vehicle be in if you are pulling a trailer up a long slow grade? If you have a tow/haul mode in the vehicle you would want to use it, and if you needed even more pulling power you could manually downshift into a lower gear. You would need to monitor engine RPMs and your gauges for any overheating. It's also important to know that some vehicles with a tow haul mode have an auxiliary braking function too that helps slow the vehicle down when you descend an incline.

Overheating: A major concern when you tow a trailer is keeping components on the tow vehicle cool. Oil, water and fluids are used to help cool and lubricate moving parts in the engine and transmission. Oil, water and transmission fluid can get extremely hot, especially when you are towing heavy loads, and it can result in damage to components like engines, transmissions and axles. This is why towing packages are important.

Towing Package: Towing a trailer requires additional equipment on the tow vehicle. This equates to a towing package. A towing package adds equipment or components to a vehicle to help increase the towing capabilities. Common items in a tow package include a hitch receiver, wiring for lights and brakes, a larger cooling system, a transmission oil cooler, engine oil cooler, upgraded suspension systems, larger brakes and larger tires. A tow package on a small cross-over vehicle will be different than one on a 1-ton truck, but the important thing is that the vehicle has the proper equipment.

Pre-Trip Checks for Tow Vehicles: Something as simple as a few quick checks prior to towing a trailer can save you time and money. The tires need to be properly inflated for the load, you need to check all the fluid levels and make sure there are no leaks anywhere. You need to check the operation of the electric brakes, and double check all the hitch work. These simple checks will contribute to a safe trip rather than a disastrous one.

Hopefully this will help clear-up some of the confusion concerning tow vehicles. There are still lots of things to learn about properly matching a tow vehicle to the trailer, and about proper hitch components to safely tow a trailer. At RV Education 101 we offer a Trailer Towing Basics instant download video and a Checklists for RVers E-book that are helpful in learning more about all of these topics.

Happy Camping,

Mark J. Polk