



Trailer Safety Info Sheet

Horse Trailering Safety: Part 2—Hitch Systems

The previous info sheet covered the following components of a trailering system:

1. Vehicle Information Decals

This info sheet will cover:

2. Trailer Hitch System

3. Safety Chains

4. The Breakaway System

5. Trailer Brake Controller

2. Trailer Hitch System

A truck and trailer should be thought of as two separate vehicles, joined by the trailer hitch. The trailer hitch itself is a system with multiple components. Each component must be rated to carry, at a minimum, the trailer's weight. Ideally, there should be excess capacity. Think of each component of the hitch system as a link in a chain, with the chain only being as strong as its weakest link.

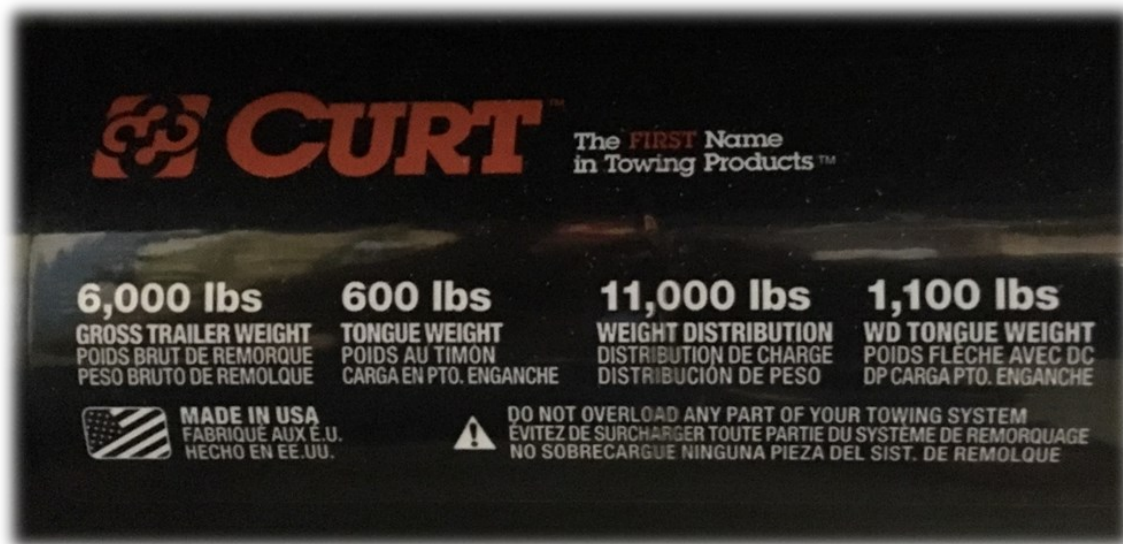


The first link in the chain is the tow vehicle hitch, which may be factory installed (as shown above) or an aftermarket item supplied by manufacturers such as Reese, Curt, or others. Check the hitch condition—a rusted hitch may no longer be the rated, designed strength. A decal should be present with hitch capacities that are clearly marked. On some vehicles (such as the example truck used in this article), the decal can be hard to read due to its location, as shown above.

A) Hitch Ratings



This close-up view of a decal shows that hitch is rated for 5670 KG (12500 LBS) TWR and 567 KG (1250 LBS) tongue weight maximum. TWR exceeds the trailer’s 3655 KG (8050 LBS) GVW, and the tongue-weight range is also within specifications as a conventional trailer’s tongue weight is generally 10%–15% of trailer GVW. At the 3655 KG (8050 LBS) maximum GVW of the example trailer, tongue weight will be 365–548 KG (805–1207 LBS).



Check hitch ratings carefully. This aftermarket hitch, installed on an F150, is limited to 6000 pounds trailer weight and 600 pounds tongue weight unless a weight distribution hitch is used. If used as a weight carrying hitch, capacity is 2050 pounds less than example trailer’s maximum GVW of 8050 pounds.



Photo courtesy: Linda Shantz

Here (above) is an example of a weight-distribution hitch. The ball and coupler are similar to a weight-carrying hitch, but added spring bars transfer the load from the rear of the tow vehicle to all axles on the tow vehicle and trailer.



B) Drawbars

A drawbar to which a hitch ball is bolted is the next component. This one is rated for 4536 KG (10000 LBS), well in excess of the trailer's 3655 KG (8050 LBS) GVW. Use the pin supplied by the drawbar manufacturer when attaching the drawbar to the hitch. If the pin is lost or damaged, purchase the correct replacement part (never use a bolt as a "temporary" replacement) and always remember to attach the spring clip, which secures the drawbar pin. A spare pin and spring clip to keep in the trailer or tow vehicle is a worthwhile investment.



Drawbars are available in a range of heights to suit your specific tow vehicle and trailer combination to ensure the trailer rides level. A level ride is important for the following reasons:

- Comfort for your horses who travel standing up;
- Security of the trailer hitch connection, which has a limited range of vertical motion and is designed to work in a level position; and
- Keeping axle weights equal.

Horse trailers generally use rubber torsion axles, which provide a smooth ride and low floor height but have a limited amount of suspension travel. A trailer which is nose-high or nose-low will place the majority of its weight on only one axle, possibly resulting in tire failure from overloading. Wheels on the other axle will carry very little weight and are likely to lock up and skid when braking, resulting in flat spots on the tires.

C) Trailer Hitch Ball

Many horse trailers use a 2-5/16" diameter ball. Check the rating stamped into the ball to be sure it is of sufficient capacity. The hitch ball pictured on the left is from the example truck and has a 4536 KG (10000 LBS) rating, which matches the drawbar. The ball shown on the right is also 2-5/16" in diameter but is only rated for 2722 KG (6000 LBS), well below our example trailer's 3655 KG (8050 LBS) GVW.



D) Trailer Coupler



The trailer coupler is the next component in the system. This component is attached to the trailer tongue and is the part which actually connects the trailer to the hitch ball. It is important that this component is of the proper capacity (ideally, greater than the trailer's maximum GVW) and the proper size to match the hitch ball. This example is rated for 5670 KG (12,500 LBS, well in excess of the trailer's 3655 KG (8050 LBS) GVW) and sized for a 2-5/16" hitch ball which matches the tow vehicle.

All the components described above make up the hitch system connecting the tow vehicle and trailer. Think of this hitch system as "Plan A." Next, we will review the backup, "Plan B", components.

3. Safety Chains

Safety chains are "Plan B." The purpose of safety chains is to keep the trailer connected to the tow vehicle if the hitch system fails from either parts breakage or human error. (A common human error is forgetting to lock the trailer coupler in the closed position.)

Chain is manufactured in different sizes and grades, with size being the diameter of steel the chain is made from and grade designated by one of the following numbers: 30, 43, 70, 80, 100, with the lowest number (Grade 30) being the weakest. Grade 70 chain generally has a gold-coloured finish, and the number 7, 70, or 700 will be visible on about every sixth link.

3/8" grade 70 chain is what many trailer manufacturers provide. If it is necessary to replace safety chains on your trailer, be sure to purchase chains and hooks of the correct size and grade.



Safety chain hooks must be the same size and grade as the chain. The chain and hook pictured above are 3/8" grade 70, as indicated by the gold-coloured finish and "G70" on the hook. The hook also has a spring-loaded safety latch to keep it securely attached to the tow vehicle's hitch.



Examples of commonly seen but incorrect safety chain hooks are shown above. On the left is a 5/16" hook, lighter than a 3/8" chain and with no safety latch. The centre hook is 3/8" and grade 70 but also does not have a safety latch. Never rely on gravity alone to keep safety chains attached! The snap link on the right is convenient to use but is not rated for any kind of load and should never be used to attach trailer safety chains.



Safety chains should be crossed to form a cradle into which the trailer tongue will drop if the trailer becomes disconnected from the tow vehicle. Chains should be a length that will allow full range of motion when maneuvering the trailer but not drag on the road surface. Attach hooks to the hitch with safety latches down as shown.

4. Breakaway System



The breakaway system can be considered “Plan C.” Its function is to apply the trailer brakes if the trailer becomes *completely* separated from the tow vehicle—a worst-case situation where the hitch and safety chains both fail or become detached.



Because of its “Plan C” nature, the trailer’s breakaway switch cable should be attached to a point on the tow vehicle that is entirely independent of the hitch and safety chains. In the example shown, a small eyebolt has been installed in a pre-existing hole in the truck’s bumper bracket, completely separate from the hitch and safety chains. Since the breakaway switch cable does not carry any weight, a snap link is suitable for attachment to the tow vehicle.



To test breakaway system operation before you head out on the road, pull the plastic pin out of the breakaway switch housing as shown in the photo—this should fully apply the trailer brakes. Attempt to drive forward. The trailer brakes should be fully applied and prevent forward motion. If the truck/ trailer combination does move forward with no resistance, manually apply trailer brakes using the tow vehicle's brake controller to check if the brakes are operational. If trailer brakes do operate when applied manually, one or more of the following issues may exist in the breakaway system:

- Breakaway battery low or completely discharged
- Damage or corrosion in wiring between breakaway switch and brake circuit
- Damaged or defective breakaway switch

If trailer brakes still do not operate when applied manually, a more serious problem exists with the braking system and must be repaired before taking the trailer on the road. Some common causes of inoperative trailer brakes are:

- Poor connection at electrical plug connecting tow vehicle to trailer
- Damaged brake wiring and/ or corroded wiring connections, including any grounds
- Damaged or defective brake electromagnets
- Brakes out of adjustment
- Badly worn brake shoes and/ or drums

5. Trailer Brake Controller

The last step is setting output and sensitivity on the trailer brake controller. Refer to your specific brake controller manufacturer's instructions for this step.

Output is the maximum amount of power the brake controller will apply to the trailer brakes. The 5.0 setting pictured is one that we have found works well for the example truck and trailer combination with two horses on board.



Sensitivity is how aggressively the controller will apply the trailer brakes. Too low a sensitivity setting will result in trailer brakes applying very slowly. If the sensitivity is set too high, the trailer brakes will apply very quickly, resulting in one or more trailer wheels locking up and skidding. In addition to the jerking motion and rough ride this will create, tire damage in the form of flat spots from skidding is also possible.

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Photos by Robert Nagle *(except as noted)*

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