

# SHADOW



**GENERAL TRAILER  
USER'S MANUAL**



**SHADOW TRAILERS, LLC**

**⚠ WARNING**

**This User's Manual contains safety information and instructions for your trailer.**

**You must read this manual before loading or towing your trailer.**

**You must follow all safety precautions and instructions.**

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# **1 - INTRODUCTION & WARRANTY**

## **1.1 - INTRODUCTION**

Thank you for choosing Shadow Trailers for your new trailer! We pride ourselves in building in quality and function into all of the trailers we manufacture so that you are able to utilize and enjoy your trailer for many years.

This manual will cover information regarding the basic trailer and not the living quarters (if applicable). The operation of the living quarters is covered in a separate manual. Read, understand, and follow the contents of this manual before attempting to load or use your trailer. Keep all manuals and literature provided, for your trailer, products utilized, or otherwise, with your trailer in a safe place in your trailer at all times.

Our trailers are built with components produced by various manufacturers. Some of these items have separate manuals. Where this manual indicates that you should read another manual, and you do not have that manual, call Shadow Trailers at 352-529-2190 or your dealer for assistance.

You must also read, understand, and follow the contents of manuals/literature from all applicable component/product manufacturers, tow vehicle manufacturer, hitch manufacturers. If there is a discrepancy discovered between the information contained in this manual and the information contained in a manual/literature of a component/product, the tow vehicle, or hitch then the information in such manual/literature should supersede information in this manual.

## **1.2 - WARRANTY**

### **SHADOW TRAILERS, LLC LIMITED WARRANTY**

#### **COVERAGE:**

Shadow Trailers, LLC ("Shadow Trailers") warrants to the original "buyer" that its Shadow trailer, on the date of purchase, is free from defects in composition of material and/or workmanship under normal conditions of use.

The warranty covers:

- The main trailer structure, consisting of floor cross members, side wall and roof extrusions, side rails, and sub-frames for a period of seven (7) years
- Certain other parts manufactured by Shadow Trailers and attached to the main trailer structure: This includes doors, gates, dividers, floors, and roof for a period of two (2) years.
- Sealant, including roof sealant/tape, caulking throughout the exterior of the unit, for a period of one (1) year, and is considered normal maintenance thereafter.
- Electrical wiring and connections for a period of one (1) year.
- (If applicable) Living Quarters (LQ) interior and related items manufactured by Shadow Trailers including wall panels, cabinets, electrical wiring, and plumbing, and the installation of LQ interior and components, for a period of one (1) year.

This limited warranty shall begin on the original date of purchase as a new, unused trailer by the original buyer (the first person or entity to purchase the trailer from a Shadow authorized dealer). This warranty shall not extend beyond the warranty period described here.

**WARRANTY REGISTRATION:**

Buyer's Warranty Registration must be filed with the manufacturer at the time of purchase or at the latest within ten (10) days of the purchase date to validate/activate this warranty. To file your Warranty Registration, go to [shadowtrailer.com/warranty](http://shadowtrailer.com/warranty), fill out the form in its entirety and click the SUBMIT button. You will receive an email confirmation that we received your Warranty Registration. If the Warranty Registration is not filed within those ten (10) days from the date of purchase, the trailer will have a one-year limited warranty from the date of purchase.

**NOTIFICATION/CLAIMS:**

Buyer/Authorized Dealer shall give Shadow Trailers prompt notice of any and all defects by submitting a Warranty Claim Form electronically. To file a Warranty Claim, go to [shadowtrailer.com/warranty](http://shadowtrailer.com/warranty), fill out the Warranty Claim Form in its entirety and include all necessary pictures and description of defect(s). Upon receipt of a Warranty Claim Form, you will receive a confirmation email. Shadow Trailers shall promptly review the Warranty Claim Form and notify Buyer of its intentions and preferences to proceed. Shadow Trailers may require additional photos and/or repair estimate to examine the defect/concern prior to determining the appropriate action to be taken. Shadow Trailers will not make reimbursement for any repairs and/or adjustments made without prior written consent. Shadow Trailers has the sole right to determine if any condition warrants being covered under this warranty. Shadow Trailers may at its discretion offer a verbal authorization to facilitate an expedient repair in special cases.

**REMEDIES:**

In the event of any defect in material or workmanship covered by this warranty, Shadow Trailers at its discretion will:

- Replace the defective part or correct the defective work on a no-charge basis.
- Provide for the repair of the defect by an authorized dealership or service center.
- Shadow Trailers shall, at their own expense, reimburse the Buyer to perform the same work or some combination of the above upon written approval.
- Shadow Trailers at its discretion will have the right to determine what resolution to any warranty issue, and what cost of such resolution, will be approved.
- Use of 3M VHB (or similar) tape and/or other adhesives are used in adhering the exterior sheeting to provide a mostly rivetless exterior. In the event of an adhesion failure, which can be caused by many different conditions out of Shadow Trailers' control, Shadow Trailers may add rivets or screws as part of the warranty resolution.
- Shadow Trailers may require the trailer or the defective part to be returned to the plant in Williston, Florida or Yukon, Oklahoma for repairs.



## EXCLUSIONS:

This warranty does not cover the following items:

- Items which are not manufactured or constructed by Shadow Trailers, include, but are not limited to, axles, coupler, brakes, jacks, awnings, windows, latches, hinges, sheeting paint, wheels, and tires. If the supplier warrants these items, and such warranty may be extended to the Buyer, and the Buyer should contact the manufacturer of these items for warranty assistance. Shadow Trailers may assist in providing contact numbers or websites of suppliers upon request. (Example: The tire supplier warrants the tires, contact the appropriate tire supplier for warranty claims.)
- Any additions, accessories, repairs, or modifications made to the trailer after trailer has been shipped from Shadow Trailers plant, unless such changes are approved in writing by Shadow Trailers.
- Normal wear items including, but not limited to, bearings, brakes, brake shoes/pads, tires, hinges, hoses, wiring, lights, springs, interior and exterior tie rings, door hold-backs, rubber products, padding, carpet, paint, graphics, or logos/decals.
- Damage or loss caused by lack of maintenance.
- Mold remediation. Mold can occur due to leaks, condensation, humidity, etc. and is the customer's responsibility to prevent.
- Freezing conditions can cause damage to plumbing and fittings and other related components, customers must be responsible for performing preventative steps to ensure no damage occurs due to inclement weather conditions.
- Damage or loss caused, in whole or part, by accident or negligence, abuse, misapplication, misuse of trailer or its components, or failure to torque lug nuts properly.
- Any incidental or consequential damages based upon negligence, breach of contract, or any other legal theory incurred as a result of any defect, to include loss of time, inconvenience, loss of revenue, loss of use of trailer, travel expenses, lodging, meals, storage, or any other costs incurred by the Buyer relating to any warranty claim.
- All transportation charges in connection with a warranty claim will be the sole responsibility of the Buyer.
- Should Shadow Trailers request any part(s) to be returned to Shadow Trailers for warranty resolution, such part(s) must be sent pre-paid freight.
- Damage or loss caused, in whole, or in part, by road salt, salt air, improper wash solvents, acid rain, industrial fallout, or any act deemed an act of God or nature that are uncontrollable.
- Damage or loss caused by any collision, animals, trees or branches of, or any other external forces.
- It is the responsibility of the Buyer to properly secure any and all personal belongings in the trailer, including saddles secured on the saddle racks. Shadow Trailers will not in any way be held responsible for any damage to personal property.
- **Commercial hauling with trailer. Shadow Trailers warranty on units for commercial use is a total limited warranty for one (1) year from the date of purchase on the trailer's main structure.**

## **VOIDING OF WARRANTY:**

The following items will void this warranty:

- Overloading, misuse, neglect of trailer, or failure to provide normal maintenance.
- Unauthorized repairs, modifications, alterations, to the trailer frame, structure, roof, or floor. Any changes must have prior written authorization from Shadow Trailers.
- Defacing, altering, or removing the trailer's vehicle identification label.
- Pulling the trailer with a tow vehicle that is rated higher than a one-ton pickup truck, unless written authorization is provided by Shadow Trailers and Shadow Trailers has designed and built the trailer for such use.

## **OTHER NOTICES:**

- Shadow Trailers and its authorized dealers reserve the right to make changes in design, make additions, and/or improvements without any obligation to make the same or similar changes to trailers previously built and covered by this warranty.
- Buyer's sole and exclusive remedies for any damage or loss in any way connected with the trailer manufactured by seller's breach of warranty, negligence, or any breach of any other duty shall be at Shadow Trailers' option, repair or replacement to correct the defects in materials or workmanship.
- In the event a warranty claim is submitted to Shadow Trailers, it is the Buyer's responsibility to immediately make necessary provisions to temporarily eliminate the source of the problem to prevent any and all resulting damages and/or necessary repairs from worsening. Failure to do so may void any and all prior warranty repair approval.
- **A THOROUGH ROOF INSPECTION AND CLEANING MUST BE PERFORMED ON A REGULAR INTERVAL (MONTHLY). FAILURE TO COMPLETE THIS INSPECTION MAY RESULT IN VOIDING OF ANY AND ALL WARRANTY ON ROOF STRUCTURE.**
- **FOR HORSE AND LIVESTOCK TRAILERS, A THOROUGH CLEANING OF THE ALUMINUM FLOOR AND FLOOR MATS MUST BE PERFORMED ON A MONTHLY BASIS, AT A MINIMUM. THIS SHOULD BE DONE BY REMOVING ANY AND ALL MATS AND WASHING ALL ANIMAL WASTE OFF THE ALUMINUM FLOOR AND MATS. DUSTING THE FLOOR WITH BAKING SODA WILL HELP NEUTRALIZE ANY ACIDIC RESIDUE THAT COULD CAUSE CORROSION. FAILURE TO DO SO MAY RESULT IN VOIDING OF ANY AND ALL WARRANTY ON THE FLOOR.**

## **OTHER LIMITED WARRANTIES:**

This agreement is the complete and exclusive agreement between Buyer and Shadow Trailers concerning allocations of risks of damage or loss arising from defects. This warranty is expressly made in lieu of any and all other warranties expressed or implied, including warranties of merchantability and fitness, and no one is authorized to make any further or additional warranties on behalf of Shadow Trailers. This agreement allocates the risks of damage or loss arising from product defect between Shadow Trailers and Buyer and both parties recognize this allocation.

\*The Shadow Trailers warranty is not transferable.

## **2 - SAFETY INFORMATION**

### **2.1 - SAFETY ALERT SYMBOLS AND SIGNAL WORDS**

This manual provides instructions for the operation and care of Horse, Livestock, Enclosed, and Open Car Trailers manufactured by Shadow Trailers. The instructions in this manual must be followed to ensure the safety of persons, horses and livestock, cargo, and satisfactory life of the trailer. Safety precautions to protect against injury or property damage must be followed at all times.

It is impossible to cover specifics necessary of every possible combination of trailer, tow vehicle, and hitch/coupler. This manual provides general trailer and safety information. Therefore, you must read, understand and follow the instructions given by the tow vehicle and trailer hitch manufacturers, as well as the instructions in this manual.

Our trailers are built with components produced by various manufacturers. Some of these items have separate instruction manuals. Where this manual indicates that you should read another manual, and you do not have that manual, call Shadow Trailers at 352-529-2190 or your dealer for assistance.

Safety alert boxes include pertinent safety information throughout this manual.

The level of risk is indicated by the following safety alert boxes:

#### **DANGER**

**DANGER - Immediate hazards which WILL result in severe personal injury or death if the warning is ignored.**

#### **WARNING**

**WARNING - Hazards or unsafe practices which COULD result in severe personal injury or death if the warning is ignored.**

#### **CAUTION**

**CAUTION - Hazards or unsafe practices which could result in minor or moderate injury if the warning is ignored.**

## NOTICE

**Notice - Practices that could result in damage to the trailer or other property.**

### **2.2 - MAJOR HAZARDS**

Loss of control of the trailer or trailer/tow vehicle combination can result in death or serious injury. The most common causes of loss of control of the trailer are:

- Driving too fast for conditions
- Improper sizing of the tow vehicle for the trailer
- Overloading the trailer or loading the trailer unevenly
- Trailer improperly coupled to the hitch
- Inadequate tow vehicle or towing hitch
- No braking on the trailer
- Not maintaining proper tire pressure
- Not keeping the lug nuts tight
- Not properly maintaining trailer structure

#### **2.2.1 - DRIVING TOO FAST**

The maximum towing speed of your trailer-vehicle combination is 60mph. Driving too fast can cause tire failure. Driving too fast can also cause loss of control of the tow vehicle and/or the trailer. Maintain a speed of no more than 60mph to ensure safety of you, your precious cargo, and others.

### **WARNING**

**Driving too fast can cause loss of control resulting in serious injury or death. Decrease speed as necessary as weather, traffic, lighting, or road conditions deteriorate.**

#### **2.2.2 - IMPROPER SIZING OF TOW VEHICLE FOR THE TRAILER**

Pulling a trailer with a tow vehicle that is not capable of towing a trailer of such weight can be dangerous and lead to stability problems or loss of control. Damage to the tow vehicle can also occur as a result of the same scenario. The maximum towing capacity of your towing vehicle should be observed and should not be exceeded. The towing capacity of your tow vehicle should be found in the vehicle's Owner's Manual as maximum Gross Trailer Weight (GTW) and maximum Gross Combined Weight Rating (GCWR). If you are unable to find this information, contact the appropriate dealer that deals with the tow vehicle in question to acquire the necessary information.

**⚠ DANGER**

**Use of an underated hitch (and related components), ball, or tow vehicle can result in loss of control resulting in serious injury or death.**

**Make certain your hitch (and related components), ball, and tow vehicle are rated high enough for your trailer.**

**2.2.3 - FAILURE TO ADJUST DRIVING BEHAVIOR WHILE TOWING A TRAILER**

When towing a trailer, you will have decrease acceleration, increased stopping distance, and increased turning radius (which means you must make wider turns to keep from hitting curbs, vehicles and anything else that is on the inside corner). In addition, you will need a longer distance to pass, due to slower acceleration and increased length.

- Be alert for slippery conditions. You are more likely to be affected by slippery roads when driving a tow vehicle with a trailer, than driving a tow vehicle without a trailer.
- Anticipate the trailer “swaying.” Swaying is the trailer reaction to the air pressure wave caused by passing trucks and buses. Continued pulling of the trailer provides a stabilizing force to correct swaying. Do not apply the brakes to correct trailer swaying.
- Check review mirrors frequently to observe the trailer and traffic.
- Use lower gear when driving down steep or long grades. Use the engine and transmission as a brake. Do not ride the brakes as they can overheat and become ineffective.
- Be aware of your trailer height; especially when approaching bridges, overpasses, roofed areas and when around trees or other structures.

**2.2.4 - TRAILER NOT PROPERLY COUPLED TO THE HITCH**

It is critical that the trailer be securely coupled to the hitch, and that the safety chains and emergency breakaway brake lanyard are correctly attached. Uncoupling may result in serious injury or death to you and/or to others.

**⚠ WARNING**

**Coupler and hitch selection and condition are critical for safe towing.**

**Uncoupling can result in serious injury or death.**

- **Make sure the hitch and ball are rated for the trailer.**
- **Make sure the hitch (ball size) matches the coupler.**
- **Check the hitch ball for wear, corrosion, and cracks before coupling to the trailer.**
- **Make sure the hitch ball is tight to the hitch before coupling the trailer.**

**⚠ WARNING**

**An improperly coupled trailer can result in serious injury or death.**

**Do not move the trailer until:**

- **The coupler is secured and latched;**
- **The safety chains are secured to the tow vehicle; and**
- **The trailer jack(s) are fully retracted.**

**Do not tow the trailer on the road until:**

- **The trailer brakes are checked;**
- **The breakaway switch is connected to the tow vehicle;**
- **The load is secured to the trailer; and**
- **The trailer lights are connected and checked.**

### **2.2.5 - PROPER USE OF SAFETY CHAINS/CABLES**

If your trailer comes loose from the hitch for any reason, we have provided safety chains or safety cables so control of the trailer can still be maintained to safely bring the trailer and tow vehicle to a stop.

**⚠ WARNING**

**Improper rigging of the safety chains or safety cables can result in loss of control of the trailer and tow vehicle, leading to serious injury or death, if the trailer uncouples from the tow vehicle.**

- **Fasten hooks of the safety chains or cables to frame of tow vehicle. Do not fasten chains or cables to any part of the hitch unless the hitch has holes or loops specifically for that purpose.**
- **Cross chains or cables underneath hitch and coupler with enough slack to permit turning and to hold the tongue up if the trailer comes uncoupled.**

**2.2.6 - PROPER CONNECTION OF BREAKAWAY BRAKE**

If equipped with brakes, your trailer will be equipped with a breakaway brake system that can apply the brakes on your trailer if your trailer uncouples from the tow vehicle for any reason. You will have a separate set of instructions for the breakaway brake system if your trailer is so equipped. The breakaway brake system, including battery, must be in good condition and properly rigged to be effective. Also be sure to allow enough slack in the break-away brake lanyard such that the switch will only activate (pin pulls out of the switch) if the coupler connection comes loose.

**⚠ WARNING**

**An ineffective or inoperative breakaway brake system can result in a runaway trailer which can lead to serious injury or death if the coupler, hitch, or ball fails.**

**Before towing the trailer, test the function of the breakaway brake system. If the breakaway brake system is not working, do not tow the trailer, have it serviced or repaired.**

**The breakaway brake system lanyard must be connected to the tow vehicle; NOT to the safety chains or safety cables; NOT to the hitch, ball, or support.**

## 2.2.7 - MATCHING TRAILER AND HITCH

### **DANGER**

**Use of a hitch with a load rating less than the load rating of the trailer can result in loss of control and may lead to serious injury or death.**

**Use of a tow vehicle with a towing capacity less than the load rating of the trailer can result in loss of control which may lead to serious injury or death.**

**Be sure your hitch and tow vehicle are rated for the Gross Vehicle Weight Rating (GVWR) of your trailer.**

## 2.2.8 - UNSAFE TIRES, UNSAFE WHEELS OR LOOSE LUG NUTS

Just as with your tow vehicle, the trailer tires and wheels are important safety items. Therefore, it is essential to inspect the trailer tires before each tow.

If a tire has a bald spot, bulge, cut, cracks, or is showing any cords, replace the tire before towing. If a tire has uneven tread wear, take the trailer to a dealer service center for diagnosis. Uneven tread wear can be caused by tire imbalance, axle misalignment or incorrect inflation.

Tires with too little tread will not provide adequate frictional forces on wet roadways and can result in loss of control, leading to death or serious injury.

Improper tire pressure causes increased tire wear and may reduce trailer stability, which can result in a tire blowout or possible loss of control. Therefore, before each tow you must also check the tire pressure. Remember, the proper tire pressure is listed on the Certification / VIN label, normally mounted on the front left side of the trailer, and should be checked when tires are cold. Allow 3 hours cooldown after driving as much as 1 mile at 40 mph before checking tire pressure.

### **WARNING**

**Improper tire pressure may cause an unstable trailer. Blowout and loss of control may occur. Serious injury or death may result.**

**Make sure of proper tire pressure before towing trailer. Inflate tires to pressure stated on the Certification / VIN label.**



The tightness of the lug nuts is very important in keeping the wheels properly seated to the hub. Since trailer wheels and lug nuts (or bolts) are subjected to greater side loads than automobile wheels, they are more prone to loosen. Before each tow, check to make sure they are tight.

**⚠ WARNING**

**Metal creep between the wheel and the lug nuts (bolts) will cause the wheel to loosen.**

**Serious injury or death can occur if wheel comes off.**

**Tighten lug nuts (bolts) before each tow.**

The proper tightening sequence and tightness (torque) for lug nuts is listed in the "Inspection, Service & Maintenance" chapter of this manual. Use a calibrated torque wrench to tighten the lug nuts.

Lug nuts are also prone to loosen after first being mounted. When towing a new trailer (or after wheels have been remounted), check to make sure they are tightened to the proper torque after the first 10, 25 and 50 miles of driving and before each tow thereafter.

Failure to perform this check can result in a wheel parting from the trailer and a crash, leading to serious injury or death.

**⚠ WARNING**

**Lug nuts are prone to loosen after initial installation, which can lead to serious injury or death.**

**Check lug nuts for tightness on a new trailer, and after re-installing a wheel at 10, 25, and 50 miles and every 50 miles thereafter during the first 200 miles of travel.**

**⚠ WARNING**

**Inadequate lug nut torque can cause a wheel separating from the trailer, leading to serious injury or death.**

**Be sure lug nuts are tight to the proper torque before each tow.**

## 2.2.9 - OVERLOADING

The total weight of the load (or cargo) you put in or on the trailer, plus the empty weight of the trailer itself, must not exceed the trailer's Gross Vehicle Weight Rating (GVWR). If you do not know the empty (or loaded) weight of the trailer, you must measure it at a commercial scale. Any empty weight provided by Shadow Trailers is only an estimate. In addition, you must distribute the load in the trailer such that the load on any tire or axle does not exceed the tire load rating or the Gross Axle Weight Rating (GAWR).

Proper loading of your trailer is essential for your safety. Tire, wheel, axle or structural failure can be caused by overloading.

### **WARNING**

**An overloaded trailer can result in failure or in loss of control of the trailer, leading to serious injury or death.**

**Never load a trailer so that the weight on any tire exceeds its rating.**

**Never exceed the trailer Gross Vehicle Weight Rating (GVWR).**

**Never exceed an axle Gross Axle Weight Rating (GAWR).**

## 2.2.10 - UNSAFE LOAD DISTRIBUTION

Improper front/rear load distribution can lead to poor trailer sway stability or poor tow vehicle handling. Poor trailer sway stability results from tongue weights that are too low, and poor tow vehicle stability results from tongue weights that are too high. Refer to "Loading the Trailer" for more information.

In the table below (Table 2 - 1), the second column shows the general rule of thumb percentage of total weight of the trailer plus its cargo (Gross Trailer Weight, or GTW) that should bear on the tongue of the trailer. For example, a gooseneck trailer, with a loaded weight of 12,000 pounds, should have 20%-25% of 12,000 pounds (2400-3000 lbs.) on the hitch. After loading, be sure to check that none of the axles and/or tires are overloaded.

Typical Tongue Weight as a Percentage of Loaded Trailer Weight	
Type of Trailer	Percentage
Bumper Pull / Tagalong	10%-15%
Gooseneck	20%-25%
Gooseneck with Living Quarters	30%-35%

Table 2 - 1

Uneven left / right load distribution can cause tire, wheel, axle or structural failure. Be sure your trailer is evenly loaded left / right. Towing stability also depends on keeping the center of gravity as low as possible.

**⚠ WARNING**

**An improperly distributed load can result in loss of control and can lead to serious injury or death.**

**Proper tongue weight is essential for stable trailer handling.**

**Distribute the load as necessary, front to rear, to provide proper tongue weight.**

**Distribute the load evenly, left to right, to avoid tire overload.**

**Keeping the center of gravity low and centered is essential to minimize the risk of tip-over.**

**2.2.1 1 - SHIFTING CARGO**

Since the trailer "ride" can be bumpy and rough, you must secure your cargo so it does not shift while the trailer is being towed.

**⚠ WARNING**

**A shifting load can result in failure, or to loss of control of the trailer, and can to serious injury or death.**

**You must tie down all loads with proper sized fasteners, ropes, straps, etc. to prevent the load from shifting while trailering.**

Be certain the door safety latch is engaged to prevent the door latch from opening. If the door latch is equipped with a catch that has a hole for a linchpin, use a linchpin to prevent the door latch from opening. If the door latch is equipped with a deadbolt, be sure to lock the deadbolt to prevent the door from opening.

**⚠ WARNING**

**Always secure the door latch(es) after closing. Place a linchpin in the catch(es) if possible. Lock the deadbolt(s) if possible.**

**If the door(s) opens, your cargo may be ejected on the road, resulting in serious injury or death to the animals (if applicable) or other drivers.**

**2.2.12 - INAPPROPRIATE CARGO**

Your trailer may be designed for specific cargo, for example, only for horses. If your trailer is designed for specific cargo, only carry that cargo in the trailer. A trailer must not be used to carry certain items, such as people, containers of hazardous substances or containers of flammable substances. A trailer not designed with living quarters should only be used for transportation of its intended cargo.

**⚠ DANGER**

**You can die or be brain damaged by Carbon Monoxide.**

**Do not operate a generator, portable grills, portable heaters, portable lanterns, or portable stoves inside the trailer.**

**⚠ WARNING**

**Never transport people inside your trailer, even if it has a living quarters. The transport of people puts their lives at risk and may be illegal.**

**⚠ WARNING**

**Do not sleep in a trailer not equipped with living quarters.**

**A trailer not designed with living quarters should only be used for transportation of its intended cargo.**

**⚠ WARNING**

**Do not transport flammable, explosive, poisonous, or other hazardous materials in your trailer.**

**Exceptions:**

- **Fuel in the tanks of vehicles that are being towed.**
- **Fuel stored in proper containers used in living quarters for cooking.**
- **Fuel stored in the tank of an on-board generator.**
- **Fuel in other factory installed fuel tanks.**

**⚠ WARNING**

**Do not transport "loose" livestock in your horse trailer. They can cause the trailer to become unstable and can result in loss of control.**

**Use a trailer designed to transport "loose" livestock.**

### **2.2.13 - INOPERABLE BRAKES, LIGHTS, OR MIRRORS**

Be sure that the brakes (if equipped) and all of the lights on your trailer are functioning properly before towing your trailer. Electric brakes and lights on a trailer are controlled via a connection to the tow vehicle, generally a multi-pin electrical connector. Check the trailer taillights by turning on your tow vehicle headlights. Check the trailer brake lights by having someone step on the tow vehicle brake pedal while you look at trailer lights. Check the turn signal lights by operating the turn signal lever in the tow vehicle.

If your trailer has electric brakes, your tow vehicle should have an electric brake controller that sends power to the trailer brakes. Before towing the trailer on the road, you must operate the brake controller while trying to pull the trailer in order to confirm that the electric brakes operate. While towing the trailer at less than 5 mph, manually operate the electric brake controller in the tow vehicle cab. You should feel the operation of the trailer brakes. If the trailer is equipped with electric/hydraulic brakes follow the same procedure to ensure proper brake operation.

## **WARNING**

If the trailer is equipped with electric brakes or electric/hydraulic brakes it is highly recommended that the trailer be towed by a vehicle equipped with an electric brake controller. The absence of an electric brake controller (OEM equipped or aftermarket) may render the trailer brakes inoperable.

## **WARNING**

**Improper electrical connection between the tow vehicle and the trailer will result in inoperable lights and electric brakes, and can lead to loss of control or collision.**

**Before each tow:**

- **Check to ensure all lights on trailer work.**
- **Check to ensure that the electric brakes work by operating the brake controller inside the tow vehicle.**

Standard mirrors usually do not provide adequate visibility for viewing traffic to the sides and rear of a towed trailer. You must provide mirrors that allow you to safely observe surrounding and approaching traffic.

### **2.2.14 - HAZARDS FROM MODIFYING YOUR TRAILER**

Essential safety items can be damaged by altering your trailer. Even simply driving a nail or screw to hang something can damage an electrical circuit, LP gas line or other feature of the trailer.

Before making any alteration to your trailer, contact your dealer or Shadow Trailers at 352-529-2190 and describe the alteration you are contemplating. Alteration of the trailer structure or modification of mechanical, electrical, plumbing, heating or other systems on your trailer must be performed only by qualified technicians who are familiar with the system as installed on your trailer. Altering your trailer may void the manufacturer's limited warranty. See "Warranty" in Section 1.

### **2.2.15 - HAZARDS TO HORSES (HORSE TRAILER)**

Before hauling a horse, you must be aware of its temperament.

The layout of a horse trailer is designed to safely contain your horse. The trailer is equipped with stall dividers and tie rings to secure the horse. Restraining a horse without using a combination of a tie-strap and stall dividers may result in serious injury or death to the horse.

Before loading your horse, inspect the interior of the horse trailer to ensure no hazards are present. Read the “Loading Horses (Horse Trailer)” section of this manual for specific instructions regarding trailering of horses.

**⚠ WARNING**

**When a horse is frightened it is capable of inflicting serious injury or death to a human handler.**

**Know your horse's temperament before attempting to trailer it.**

**Handling a horse that is not trailer-acclimated may result in injury or death, or damage to the trailer.**

**Do not haul an unbroken horse in this trailer.**

**Horses must have a halter.**

**⚠ CAUTION**

**Failure to secure a horse using a tie strap may result in its serious injury or death.**

**⚠ CAUTION**

**The trailer's interior may contain hazards to a horse that can result in its serious injury or death.**

**Before loading a horse, inspect the trailer's interior and adjust or repair all loose, sharp, or protruding features such as handles, loose or broken parts of the trailer, etc.**

**Before towing trailer:**

- **Lock/latch all stall dividers**
- **Be sure all saddles, tack and equipment, as well as horse(s), are prevented from being thrown about in transit.**

**⚠ CAUTION**

**Hauling a horse in a livestock trailer may result in its serious injury or death.**

**Do not carry a horse in a livestock trailer. Use a trailer designed to carry horses.**

**2.2.16 - HAZARDS TO LIVESTOCK (LIVESTOCK TRAILER)**

A livestock trailer is designed for the safe transport of livestock, other than horses. It is not equipped for hauling horses.

Before loading your livestock, inspect the interior of the livestock trailer to ensure that no hazards are present. Read the “Loading Livestock (Livestock Trailer)” section for specific instructions regarding trailering of livestock other than horses.

**⚠ WARNING**

**Large animals are a capable of inflicting serious injury or death to a human handler.**

**Know your animals' temperament before attempting to trailer them.**

**⚠ CAUTION**

**Failure to secure livestock using a tie strap may result in its serious injury or death.**



**⚠ CAUTION**

The trailer's interior may contain hazards to livestock that can result in its serious injury or death.

Before loading livestock, inspect the trailer's interior and adjust or repair all loose, sharp, or protruding features such as handles, loose or broken parts of the trailer, etc.

Before towing trailer be sure all tack and equipment, as well as livestock, are prevented from being thrown about in transit.

**⚠ CAUTION**

Hauling a horse in a livestock trailer may result in its serious injury or death.

Do not carry a horse in a livestock trailer. Use a trailer designed to carry horses.

### **2.2.17 - HAZARDS FROM ACCESSORIES**

The "Accessories" section of this manual contains some information about certain optional accessories that may be on your trailer. Read and follow all of the instructions in the accessory's manual and this manual before operating the accessories. The major hazards from some of these accessories are:

#### **2.2.17.1 - GENERATOR**

If your trailer is equipped with a generator, you must have and follow the generator manufacturer's instructions. You must also have one or more carbon monoxide detectors in the trailer's living quarters' accommodation spaces.

Carbon Monoxide is an odorless gas that can cause death. Be certain exhaust from a running generator does not accumulate in or around your trailer, by situations such as:

- Being drawn in by fans or ventilators operated in the trailer;
- Prevailing wind;
- Being trapped between your trailer and other trailers, vehicles, or buildings; or
- Being trapped between your trailer and/or a snow bank or other nearby objects.

**⚠ WARNING**

**Gasoline, LPG, and diesel generators pose a risk of death from:**

- **Carbon Monoxide**
- **Fire and Explosion**
- **Electrocution**

**Do not operate a generator without having a working carbon monoxide detector.**

**Do not refuel a running generator.**

**Do not refuel near ignition sources.**

**2.2.17.2 - SHORE POWER**

“Shore Power” is the name given to connecting your trailer to a source of electrical power using an extension cord specifically designed for that purpose.

**⚠ WARNING**

**Shore power poses a risk of death due to electrocution.**

**Always use an electrical cord specifically designed for shore power connection.**

**Never use an ordinary extension cord.**

**Always connect the shore power cord to a grounded source.**

**Never use a shore power cord that is altered or damaged.**

**Connect only to source of correct voltage. Make certain polarity is correct.**

**Do not overload electrical circuits and always replace fuses or circuit breakers with the correct rating.**

### 2.2.17.3 - LP GAS FUEL SYSTEM

#### **DANGER**

**You can die or be brain damaged by Carbon Monoxide.**

**Make certain the exhaust from LP appliances is directed to the outdoors.**

**Have a working carbon monoxide detector in the living quarters' accommodation spaces of your trailer before operating any LP gas appliance.**

**Do not operate portable grills, portable stoves, portable lanterns, or portable heaters inside the trailer.**

#### **WARNING**

**Risk of death due to fire or explosion.**

**Do not store LP tanks inside the trailer.**

**Only fill the tanks with liquified petroleum gas.**

**Do not connect natural gas to this system.**

**Only fill a propane tank 80% full. Overfilled tanks can release gas and cause an explosion.**

**Extinguish all pilot lights and turn off all appliances before refilling fuel or LP gas tanks.**

**⚠ WARNING**

**Risk of fire or explosion.**

**If LP gas is detected (by smell or by the LP gas detector):**

- **Do not touch electrical switches;**
- **Extinguish flames and pilot lights;**
- **Open doors and windows for ventilation;**
- **Shut off gas supply at the tank; and**
- **Leave the area until odor clears.**

**Correct the source of LP gas leakage before using LP appliances.**

**Do not use a flame to locate the source of an LP gas leak.**

**⚠ WARNING**

**Risk of fire or explosion.**

**Never use a flame, heat lamp, or hair dryer to thaw an LP regulator. Use an incandescent light bulb.**

**Do not remove the regulator cover or attempt to service the LP regulator.**

### **2.2.18 - TRAILER TOWING GUIDE**

Driving a vehicle with a trailer in tow is vastly different from driving the same vehicle without a trailer in tow. Acceleration, maneuverability and braking are all diminished with a trailer in tow. It takes longer to get up to speed, you need more room to turn and pass, and more distance to stop when towing a trailer. You will need to spend time adjusting to the different feel and maneuverability of the tow vehicle with a loaded trailer. Because of the significant differences in all aspects of maneuverability when towing a trailer, the hazards and risks of injury are also much greater than when driving without a trailer. You are responsible for keeping your vehicle and trailer in control, and for all the damage that is caused if you lose control of your vehicle and trailer.

As you did when learning to drive an automobile, find an open area with little or no traffic for your first practice trailering. Of course, before you start towing the trailer, you must follow all of the instructions for inspection, testing, loading and coupling. Also, before you start towing, adjust the mirrors so you can see the trailer as well as the area to the rear of it.

Drive slowly at first, 5 mph or so, and turn the wheel to get the feel of how the tow vehicle and trailer combination responds. Next, make some right- and left-hand turns. Watch in your side mirrors to see how the trailer follows the tow vehicle. Turning with a trailer attached requires more room.

Stop the rig a few times from speeds no greater than 10 mph. If your trailer is equipped with brakes, try using different combinations of trailer/electric brake and tow vehicle brake. Note the effect that the trailer brakes have when they are the only brakes used. When properly adjusted, the trailer brakes will come on just before the tow vehicle brakes.

It will take practice to learn how to back up a tow vehicle with a trailer attached. Take it slow. Before backing up, get out of the tow vehicle and look behind the trailer to make sure that there are no obstacles. Some drivers place their hands at the bottom of the steering wheel, and while the tow vehicle is in reverse, “think” of the hands as being on the top of the wheel. When the hands move to the right (counter-clockwise, as you would do to turn the tow vehicle to the left when moving forward), the rear of the trailer moves to the right. Conversely, rotating the steering wheel clockwise with your hands at the bottom of the wheel will move the rear of the trailer to the left, while backing up. If you are towing a bumper hitch rig, be careful not to allow the trailer to turn too much, because it will hit the rear of the tow vehicle. To straighten the rig, either pull forward, or turn the steering wheel in the opposite direction.

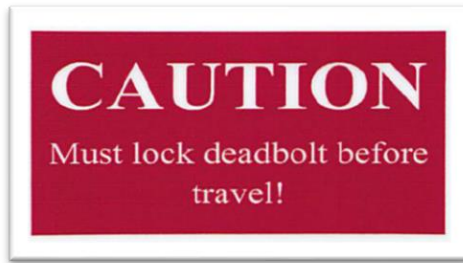
### **2.2.19 - SAFE TRAILER TOWING GUIDELINES**

- Recheck the load or cargo tiedowns, animals’ tie straps, gates, and dividers (all that are applicable) to make sure the load, cargo, and/or animals will not shift during towing.
- Before towing, check coupling, safety chains or cables, safety breakaway system, tires, wheels, and lights.
- Verify all safety latches, pins, locks, etc. on ramps, doors, gates, and rods are properly installed.
- Check the lug nuts or bolts for proper tightness.
- Check coupler tightness after towing 50 miles.
- Adjust the brake controller to engage the trailer brakes before the tow vehicle brakes. Follow the instructions given with the brake controller manufacturer’s literature.
- Use your mirrors to verify you have room to change lanes or pull into traffic.
- Use your turn signals well in advance.
- Allow plenty of stopping space for your trailer and tow vehicle.
- Do not drive so fast that the trailer begins to sway due to speed. Never drive faster than 60 m.p.h.
- Allow plenty of room for passing. A rule of thumb is that the passing distance with a trailer is 4 times the passing distance without a trailer.
- Shift your automatic transmission into a lower gear for city driving.
- Use lower gears for climbing and descending grades.

- Do not ride the brakes while descending grades, they may get so hot that they stop working. Then you will potentially have a runaway tow vehicle and trailer.
- Slow down for bumps in the road. Take your foot off the brake when crossing the bump.
- Do not brake while in a curve unless absolutely necessary. Instead, slow down before you enter the curve.
- Do not apply the tow vehicle brakes to correct extreme trailer swaying. Instead, lightly apply the trailer brakes with the hand controller.
- Make regular stops, about once each hour to confirm that:
  - The coupler is secure to the hitch and is locked;
  - Electrical connections are made;
  - There is appropriate slack in the safety chains;
  - There is appropriate slack in the breakaway switch pull pin lanyard;
  - The tires are not visibly low on pressure; and
  - The cargo is secure and in good condition.

### **2.2.20 - SAFETY WARNING LABELS ON YOUR TRAILER**

For most side entry doors, dress room doors, walk-thru doors that are equipped with a travel trailer door latch, the label in Figure 2-1 will be present under the travel trailer door latch.



*Figure 2 - 1: Deadbolt Caution Label*

If your trailer is equipped with a door that has the hinges toward the rear end of the trailer and the latch toward the front end of the trailer (“suicide door”), the label in Figure 2-2 will be present under the travel trailer door latch.



*Figure 2 - 2: Suicide Door Deadbolt Caution Label*

If your trailer is equipped with a ramp or ramp door the label in Figure 2-3 will be present near the latch handle(s).



*Figure 2 - 3: Heavy Door Danger Label*

On all trailers on the loading door or ramp the label in Figure 2-4 will be present near the latch handle.



*Figure 2 - 4: Secure All Door and Gate Latches Label*

On the side of the tongue for bumper pull models and on the gooseneck coupler for gooseneck models the label in Figure 2-5 will be present.



*Figure 2 - 5: 2-5/16" Ball Required Label*

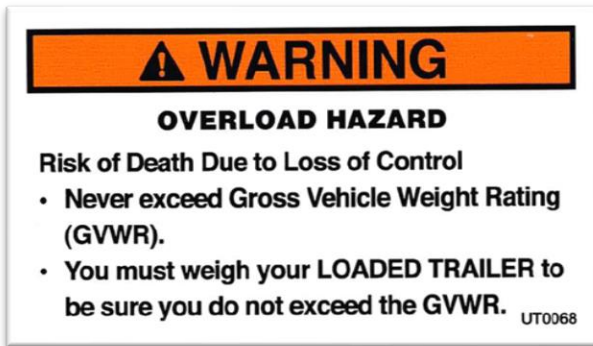


On the side of the tongue for bumper pull models and on the gooseneck coupler for gooseneck models the label in Figure 2-6 will be present.



*Figure 2 - 6: Safety Break-away Label*

Near the Certification/VIN Tag and Tire Information Placard the label in Figure 2-7 will be present.



*Figure 2 - 7: Overload Hazard Label*

On the side of the tongue for bumper pull models and on the gooseneck coupler for gooseneck models the label in Figure 2-8 will be present.



*Figure 2 - 8: Attention Driver - Wheel Lugs Label*

Centered over the fender or fenders on each side of the trailer the label in Figure 2-9 will be present.



*Figure 2 - 9: Check Wheel Lugs Label*

Inside of the trailer, the location can vary greatly depending on model, check the rear tack area (if equipped), the front walk-in tack area / dress room, or the cargo area walls for similar to the label in Figure 2-10 will be present in one of the locations.

**SHADOW**  
TRAILERS

**Built with Pride by  
Shadow Trailers, Inc.  
Williston, FL**

**This trailer is 102" wide.  
This width Trailer is legal on all US  
Federal Funded Highways.  
Some State Highway  
Regulations are less than 102",  
Please check your local  
regulations.**

---

**Required Checks Before Towing:**

- Lug nuts are tight
- Tires are properly inflated
- Trailer is not overloaded
- Electrical Connections are working
- Safety Cables are Secured to Tow Vehicle
- Brakes work properly
- Hitching Mechanism is Secure
- All Doors are Secure
- The Jack is raised up to its highest position.
- The crank handle is Secure

---

**For LIVESTOCK  
Transportation Only.  
Do Not Exceed Maximum Recommended  
Weight for this Trailer**

**Tire Pressure to be checked before each trip.**

*Figure 2 - 10: Built with Pride Label*

In trailers with no living quarters accommodations in the dress room or cargo area the label in figure 2-11 will be present.

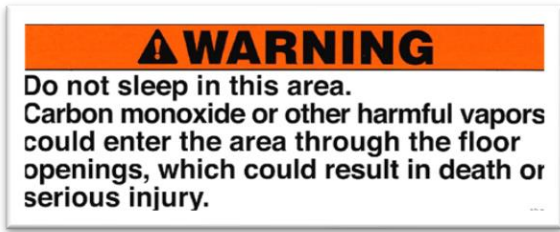


Figure 2 - 11: Carbon Monoxide Warning Label

If your trailer is a gooseneck model and is equipped with a Bulldog brand coupler the labels in Figures 2-12 and 2-13 will be present on the coupler.



Figure 2 - 12: Bulldog Coupler Warning Label



Figure 2 - 13: Bulldog GN Coupler Rating Label

If your trailer is a gooseneck model and is equipped with a Popup brand coupler the label in Figure 2-14 will be present on the coupler.



Figure 2 - 14: Popup GN Coupler Rating Label

**⚠ WARNING**

**To protect you and others against serious injury or death, all of the safety labels must remain on the trailer and must be legible.**

**If any of the safety labels are missing or cannot be read, call Shadow Trailers, LLC at 352-529-2190 for free replacement labels.**

**You will need to provide us with a description and/or picture of the label or the number at the bottom-right corner if present to ensure we send the correct label(s).**

### **2.2.21 - REPORTING SAFETY DEFECTS**

If you believe your vehicle has a defect that could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Shadow Trailers at 352-529-2190.

If NHTSA receives similar complaints, it may open an investigation, and if it finds a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Shadow Trailers.

To contact NHTSA, you may either call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153), go to <http://www.safercar.gov>, or write to:

Administrator  
NHTSA  
1200 New Jersey Ave., SE  
Washington, DC 20590.

You can also obtain other information about motor vehicle safety from <http://www.safercar.gov>.

Call 352-529-2190 to contact Shadow Trailers.

## **3 - COUPLING TO TOW VEHICLE**

Follow all of the safety precautions and instructions in this manual to ensure safety of persons, cargo, and satisfactory life of the trailer.

### **3.1 - USE AN ADEQUATE TOW VEHICLE AND HITCH**

If the vehicle or hitch is not properly selected and matched to the Gross Vehicle Weight Rating (GVWR) of your trailer, you can cause an accident that could lead to death or serious injury. If you already have a tow vehicle, know your vehicle tow rating and make certain your trailer rating is equal to or less than that of the tow vehicle. If towing a gooseneck trailer it is also very important to make certain the bed of your truck is long enough to clear the trailer during turning maneuvers.

#### **DANGER**

**Use of a hitch with a load rating less than the load rating of the trailer can result in loss of control and may lead to serious injury or death.**

**Use of a tow vehicle with a towing capacity less than the load rating of the trailer can result in loss of control, and may lead to serious injury or death.**

**Be sure your hitch and tow vehicle are rated for, at least, the Gross Vehicle Weight Rating (GVWR) of your trailer.**

#### **WARNING**

**If the trailer is equipped with electric brakes or electric/hydraulic brakes it is highly recommended that the trailer be towed by a vehicle equipped with an electric brake controller. The absence of an electric brake controller (OEM equipped or aftermarket) may render the trailer brakes inoperable.**

#### **3.1.1 - TRAILER INFORMATION**

The "Certification / VIN Tag" location figures (Figure 3-1 and 3-2) show the location of the Certification / Vehicle Identification Number (VIN) tag on your trailer whether it's a gooseneck or bumper pull respectively.



Figure 3 - 1: GN VIN Tag



Figure 3 - 2: BP VIN Tag

The trailer Certification / VIN tag contains the following critical safety information for the use of your trailer:

**MANUFACTURED BY:** Name of trailer manufacturer.

**DATE:** Month and year the trailer was manufactured.

**GVWR:** The Gross Vehicle Weight Rating is the maximum allowable gross weight of the trailer and its contents. The gross weight of the trailer includes the weight of the trailer and all of the items within it (such as cargo, water, food and other supplies). GVWR is sometimes referred to as GTW (Gross Trailer Weight), or MGTW (Maximum Gross Trailer Weight). GVWR, GTW and MGTW are all the same rating.

**GAWR:** The Gross Axle Weight Rating is the maximum gross weight that an axle can support. It is the lowest of axle, wheel, or tire rating. Sometimes the tire or wheel rating is lower than the axle manufacturer's rating, and will then determine GAWR.

The sum total of the GAWR for all trailer axles may be less than the GVWR for the trailer, because some of the trailer load is carried by the tow vehicle, rather than by the trailer axle(s). The total weight of the cargo and trailer must not exceed the GVWR, and the load on an axle must not exceed its GAWR.

**TIRES:** The tire size and load range for your trailer as originally equipped.

**RIMS:** The rim size and lip style for your trailer as originally equipped.

**COLD INFL. PRESS.:** The tire pressure (Kilopascals / Pounds per Square Inch) measured when Cold.

**SINGLE OR DUAL:** Checkboxes to indicate single or dual wheel each side of each axle.

**V.I.N.:** The trailer's Vehicle Identification Number.

**TYPE:** Type of vehicle (Trailer) followed by the Shadow Trailer's model number.



**CERTIFICATION STATEMENT:** “THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE. THIS VEHICLE CONFORMS TO ALL APPLICABLE STANDARDS PRESCRIBED UNDER THE CANADIAN MOTOR VEHICLE SAFETY REGULATIONS IN EFFECT ON THE DATE OF MANUFACTURE”

There are two additional weights that are not provided on the Certification (VIN) tag that are important, and that should be put somewhere on the trailer. These are the “empty weight” and “maximum cargo weight”.

The “empty weight” is sometimes put on the Manufacturer’s Certificate of Origin (Title) but may not be accurate for your particular trailer, due to accessories, optional equipment, etc. The best way to determine empty weight is to weigh the entire trailer on a “Certified” scale at a truck stop. This requires detaching the trailer and leaving the entire trailer on the scale. Furthermore, it is desirable to weigh the tongue weight. This can be done by re-attaching the trailer to the tow vehicle, after getting the empty weight, and then just weighing the trailer axles(s). Subtracting the axle weight from the empty weight gives you the tongue weight.

Knowing the empty weight now allows you to calculate the “maximum cargo weight”. Simply subtract the empty weight from the GVWR shown on the Certification / VIN tag. While you’re at the scale it is also a good idea to weigh the towing vehicle, with driver, in the typical towing scenario. This will provide you with the total “combination vehicle weight”, which can then be compared to the allowable Gross Combined Weight Rating (GCWR) provided by the tow vehicle manufacturer, as discussed below.

### **3.1.2 - TOW VEHICLE**

When equipping a new vehicle or an older vehicle to tow your trailer, ask the vehicle dealer for advice on how to outfit the towing vehicle. Discuss the following information and equipment with the vehicle dealer.

#### **3.1.2.1 - OVERALL CARRYING AND TOWING CAPACITY OF VEHICLE**

Vehicle manufacturers will provide you with the maximum towing capacities of their various models, as well as the GCWR. No amount of reinforcement will give a 100 horsepower, 2,500-pound truck the towing capacity that a 300 horsepower, 5,000-pound truck has.

#### **3.1.2.2 - TOWING HITCH**

The towing hitch attached to your tow vehicle must have a capacity equal to or greater than the load rating of the trailer you intend to tow. The hitch capacity must also be matched to the tow vehicle capacity.

### **3.1.2.3 - SUSPENSION SYSTEM**

A tow vehicle equipped with a factory installed "Towing Package" likely comes equipped with heavy duty springs, heavy duty tires and other suspension components which are able to serve the size and weight of the trailer that the vehicle is rated to tow. However, the addition of additional equipment may further improve the tow vehicle performance. These may include adjustable air shocks, helper springs, etc.

### **3.1.2.4 - BRAKE CONTROLLER**

The brake controller is part of the tow vehicle and is essential in the operation of the electric brakes on the trailer. If your trailer has electric brakes, it requires a brake controller be installed at the driver's position. The brake controller is not the same as the safety breakaway brake system that is installed on the trailer.

### **3.1.2.5 - SIDE VIEW MIRRORS**

The size of the trailer that is being towed and your state law regulations determine the size of the mirrors. However, some states prohibit extended mirrors on a tow vehicle, except while a trailer is actually being towed. In this situation, detachable extended mirrors are necessary. Check with your dealer or the appropriate state agency for mirror requirements.

### **3.1.2.6 - HEAVY DUTY FLASHER**

A Heavy-Duty Flasher is an electrical component that may be required when your trailer turn signal lights are attached to the tow vehicle flasher circuit.

### **3.1.2.7 - ELECTRICAL CONNECTOR**

An Electrical Connector connects the light and brake systems on the trailer to the light and brake controls on the towing vehicle.

### **3.1.2.8 - HEAVY DUTY ENGINE OIL COOLING SYSTEM**

The tow vehicle engine works harder when a trailer is being towed. Depending on the size of the trailer, you may need to install a separate engine oil cooler. Inadequate cooling may result in sudden engine failure. Ask the tow vehicle dealer if it is necessary to install a heavy-duty cooling system.

### **3.1.2.9 - AUTOMATIC TRANSMISSION OIL COOLER**

The automatic transmission of a towing vehicle handles more power when a trailer is being towed. Inadequate cooling will shorten transmission life, and may result in sudden transmission failure. Ask the tow vehicle dealer if it is necessary to install a separate oil cooler for the automatic transmission.

### **3.1.2.10 - FIRE EXTINGUISHER**

It is sensible to have a fire extinguisher in the tow vehicle.

### **3.1.2.11 - EMERGENCY FLARES AND EMERGENCY TRIANGLE REFLECTORS**

It is wise to carry these warning devices even if you are not towing a trailer. It is particularly important to have these when towing a trailer because the hazard flashers of your towing vehicle will not operate for as long a period of time when the battery is running both the trailer lights and tow vehicle lights.

### **3.1.2.12 - TIRE CHANGING EQUIPMENT**

Make certain that you have all the necessary equipment with you to change a tire on your trailer in the event of a flat tire. Your tow vehicle lug nut wrench may not be the correct size to remove and reinstall the lug nuts on your trailer. You will also need a way to raise the trailer off of the ground (making certain that all the tires are chocked) and the jack in your tow vehicle may not be adequate.

## **3.2 - COUPLING AND UNCOUPLING THE TRAILER**

A secure coupling of the trailer to the tow vehicle is essential. A loss of coupling may result in death or serious injury. Therefore, you must understand and follow all of the instructions for coupling.

The following parts are involved in making a secure coupling between the trailer and the tow vehicle:

- **Coupling:** That part of the trailer connecting mechanism by which the connection is actually made to the trailer hitch. This does not include any structural member, extension of the trailer frame, or brake controller. (per SAE J684)
- **Hitch:** That part of the connecting mechanism including the ball support platform and ball and those components that extend and are attached to the towing vehicle, including bumpers intended to serve as hitches. (per SAE J684)
- **Safety Chains (or Cables):** Chains (or cables) are permanently attached to the trailer such that if the coupler connection comes loose, the safety chains or cables can keep the trailer attached to the tow vehicle. With properly rigged safety chains or cables, it is possible to keep the tongue of the trailer from digging into the road pavement, even if the coupler-to-hitch connection comes apart.
- **Trailer lighting (and braking) connector:** A device that connects electrical power from the tow vehicle to the trailer. Electricity is used to turn on brake lights, running lights, and turn signals as required. In addition, if your trailer has a separate braking system, the electrical connector will also supply power to the trailer brakes from the tow vehicle.
- **Breakaway switch:** If the trailer becomes de-coupled from the towing vehicle, the breakaway switch lanyard, attached independently to the tow vehicle, will pull a pin in the emergency electrical breakaway switch on the trailer.

The breakaway switch is activated by a separate battery supply in the trailer such as to energize the trailer brakes independently of the towing vehicle. It is important to check the state of charge of the emergency breakaway battery before each trip. Simply pull the pin out of the switch by hand and then try to pull the trailer.

If you feel a significant drag force the brakes are activated. Be sure to reinsert the pin in the breakaway switch. Also be sure to allow enough slack in the breakaway brake lanyard such that the switch will only activate (pin pulls out) if the coupler connection comes loose.

- **Jack:** A device on the trailer that is used to raise and lower the trailer tongue. The jack is sometimes called the “landing gear.”

 **WARNING**

**An improperly coupled trailer can result in serious injury or death.**

**Do not move the trailer until:**

- **The coupler is secured and latched to the hitch;**
- **The safety chains (or cables) are secured to the tow vehicle; and**
- **The trailer jack(s) are fully retracted.**

**Do not tow the trailer on the road until:**

- **Tires and wheels are checked;**
- **The trailer brakes are connected and checked;**
- **The breakaway switch is connected to the tow vehicle;**
- **The load is secured to the trailer; and**
- **The trailer lights are connected and connected and checked.**

Trailers are produced with a variety of coupler devices. One of types listed below will pertain to your trailer:

- Bumper Pull / Tagalong (Ball Hitch) Coupler
- Gooseneck Ball Hitch Coupler

If you need more information or assistance with your coupler, contact your dealer or Shadow Trailers at 352-529-2190.

### 3.2.1 - BUMPER PULL TRAILER WITH BALL HITCH COUPLER AND TONGUE JACK

A ball hitch coupler connects to a ball that is located on or under the rear bumper of the tow vehicle. This system of coupling a trailer to a tow vehicle is sometimes referred to as “bumper pull.”

A ball hitch trailer may be fitted with a tongue jack that can raise and lower the coupler. The tongue jack is mounted to the A-frame (front, or tongue) part of the trailer. By rotating the jack handle clockwise, the jack will extend and raise the tongue of the trailer. Figure 3-3 shows a trailer with a ball hitch coupler.



*Figure 3 - 3 - Bumper pull (tagalong) with ball hitch coupler*

Be sure the Ball Hitch coupler is suitable for the size and weight of the trailer. The load rating of the coupler and the necessary ball size are listed on the trailer tongue. You must provide a hitch and ball for your tow vehicle, where the load rating of the hitch and ball is equal to or greater than that of your trailer. Also, the ball size must be the same as the coupler size. If the hitch ball is too small, too large, is underrated, is loose or is worn, the trailer can come loose from the tow vehicle, and may cause death or serious injury.

**THE TOW VEHICLE, HITCH AND BALL MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN THE TRAILER Gross Vehicle Weight Rating (GVWR).**

**IT IS ESSENTIAL THAT THE HITCH BALL BE OF THE SAME SIZE AS THE COUPLER. (Shadow Trailers typically require ball size of 2 5/16" for bumper pull models.)**

The ball size and load rating (capacity) are marked on the ball; hitch capacity is marked on the tow vehicle's hitch.

 **WARNING**

**Coupler-to-hitch mismatch can result in uncoupling, leading to serious injury or death.**

**Be sure the load rating of the hitch ball is equal to or greater than the load rating of the coupler and the trailer's GVWR.**

**Be sure the size of the hitch ball matches the size of the coupler.**

**3.2.1.1 - BEFORE COUPLING THE TRAILER TO THE TOW VEHICLE**

- Be sure the size of hitch ball matches the size of the coupler. Be sure the rating of the hitch and ball matches or exceeds the rating of the coupler and the trailer's GVWR. Hitch balls and couplers are marked with their size and rating.
- Wipe the hitch ball clean and inspect it visually and feel for flat spots, cracks and pits.

 **WARNING**

**A worn, cracked, or corroded hitch ball can fail while towing, and may result in serious injury or death.**

**Before coupling trailer, inspect the hitch ball for wear, corrosion, and cracks.**

**Replace worn or damaged hitch ball before coupling the trailer.**

- Rock the ball to make sure it is tight to the hitch, and visually check that the hitch ball nut is solid against the lock washer and hitch frame.
- Wipe the inside and outside of the coupler clean and inspect it visually for cracks and deformations; feel the inside of the coupler for worn spots and pits.
- Be sure the coupler is tight to the tongue of the trailer. All coupler fasteners must be visibly solid against the trailer frame.

## **⚠ WARNING**

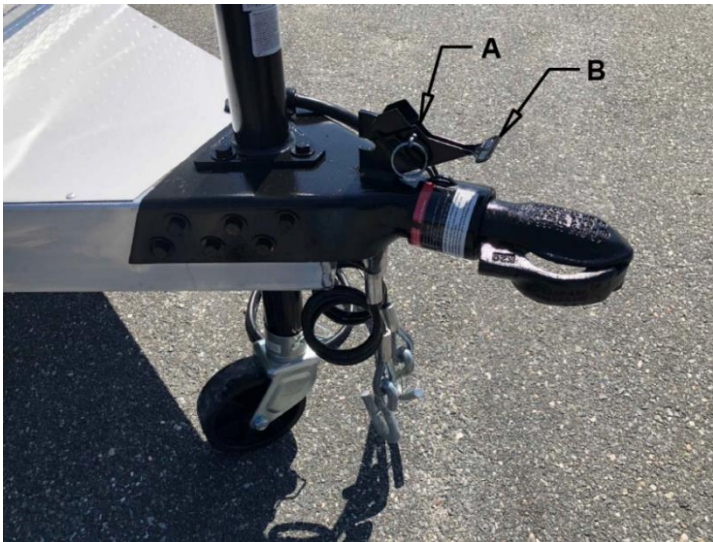
**A loose hitch ball nut can result in uncoupling, leading to serious injury or death.**

**Make sure the hitch ball is tight to the hitch before coupling the trailer.**

- Using the trailer's jack, raise the bottom surface of the coupler to be above the top of the hitch ball.

### **3.2.1.2 - PREPARING THE COUPLER AND HITCH**

- Lubricate the hitch ball and the inside of the coupler with a thin layer of automotive bearing grease.
- Remove latch safety pin (A) and open the coupler locking mechanism (B).
  - In the open position, the coupler is able to drop fully onto the hitch ball.
  - See the coupler instructions for details of placing the coupler in the "open" position. (See Figure 3-4).
- Slowly back up the tow vehicle so that the hitch ball is near or aligned under the coupler.



*Figure 3 - 4: BP Coupler (Open Position)*



*Figure 3 - 5: BP Coupler (Closed Position)*

### **3.2.1.3 - COUPLE THE TRAILER TO THE TOW VEHICLE**

- Using the jack, lower the trailer tongue until the coupler fully engages on the hitch ball. If the coupler does not line up with the hitch ball, adjust the position of the tow vehicle.
- Close the coupler and engage the coupler locking mechanism (See Figure 3-5). In the engaged position, the locking mechanism securely holds the coupler to the hitch ball. Be sure the coupler is all the way on the hitch ball and the locking mechanism is engaged.
- Insert the lock pin through the hole in the locking mechanism (See Figure 3-5).
- A properly engaged locking mechanism will allow the coupler to raise the rear of the tow vehicle. Using the trailer jack, test to see that you can raise the rear of the tow vehicle by 1 inch, after the coupler is locked to the hitch.

#### **⚠ WARNING**

**The coupler must be FULLY seated and engaged onto the hitch ball and securely latched before towing. Use  $2\frac{5}{16}$ " ball only. Failure to do so may result in serious injury or death.**

#### **NOTICE**

**The tongue jack can be damaged by overloading. Do not use the tongue jack to raise the tow vehicle more than 1 inch.**



**If the coupler cannot be secured to the hitch ball, do not tow the trailer.** Call your dealer or Shadow Trailers at 325-529-2190 for assistance.

- Continue retracting the jack to its fully retracted position.
- It is recommended to remove the caster wheel from the bottom of the parking jack for additional ground clearance while in transit. To remove the caster wheel, retract the jack until the wheel clears the ground. Then remove the bail pin attaching the wheel to the jack. Store wheel & bail pin in secure location while in transit. Continue retracting jack to its fully retracted position.

#### **3.2.1.4 - RIGGING THE SAFETY CHAINS (OR CABLES)**

- Visually inspect the safety chains and hooks for wear or damage. Replace worn or damaged safety chains and hooks before towing.
- Rig the safety chains so that they:
  - Criss-cross underneath the coupler so if the trailer uncouples, the safety chains can hold the tongue up above the road (See Figure 3-6);
  - Loop around a frame member of the tow vehicle or to holes provided in the hitch system (but, do not attach them to an interchangeable part of the hitch assembly);
  - Attach safety hooks up from underneath the hole (do not just drop into hole); and
  - Provide enough slack to permit tight turns, but not be close to the road surface to drag.



Figure 3 - 6: Proper Safety Chain (Cable) Arrangement

**⚠ WARNING**

Improper rigging of the safety chains (or cables) can result in loss of control of the trailer and tow vehicle, leading to serious injury or death, if the trailer uncouples from the tow vehicle.

- Fasten chains (or cables) to the frame of tow vehicle. Do not fasten chains (or cables) to any part of the hitch unless the hitch has holes or loops specifically for that purpose.
- Cross chains (or cables) underneath hitch and coupler with enough slack to permit turning and to hold tongue up if the trailer comes loose.

**3.2.1.5 - ATTACH AND TEST THE ELECTRICAL BREAKAWAY BRAKE SYSTEM**

If the coupler or hitch fails, a properly connected and working breakaway brake system will apply the brakes on the trailer. The safety chains will keep the tow

vehicle attached and as the trailer brakes are applied, the trailer/tow vehicle combination will come to a controlled stop.

The breakaway brake system includes a brake controller, battery and a switch with a pull pin and lanyard. Read and follow the instructions here as well as the instructions that have been prepared by the breakaway brake manufacturer. If you do not have these instructions, call Shadow Trailers at 352-529-2190 for a free copy.

The breakaway brake system is fitted with a “charging” capability that draws power from the tow vehicle. If the electrical system on your tow vehicle does not provide power to the breakaway brake battery, you must periodically charge the battery to keep the breakaway brake system in working order.



*Figure 3 - 7: Breakaway Cable Attached to Tow Vehicle*

- Visually inspect the breakaway system for broken or missing parts. Repair or replace worn, damaged or missing parts before towing trailer.
- Connect the pull pin lanyard to the tow vehicle so the pull pin will be pulled out before all of the slack in the safety chains is taken up (See Figure 3-7). Do not connect the pull pin lanyard to a safety chain, hitch ball or hitch ball assembly. This would keep the breakaway brake system from operating when it is needed.
- To test the breakaway brake battery, remove the pull pin from the switch and attempt to pull the trailer forward. You should feel the trailer resisting being towed, but the wheels will not necessarily be locked. If the brakes do not function, do not tow the trailer until brakes, or breakaway brake system are repaired.

- Immediately replace the pull pin. The breakaway brake system battery discharges rapidly when the pull pin is removed.

**⚠ WARNING**

**An ineffective or inoperative breakaway brake system can result in a runaway trailer, leading to serious injury or death, if the coupler or hitch fails.**

**Connect the breakaway cable to the tow vehicle; and NOT to the safety chains/cables, hitch, ball or support.**

**Before towing the trailer, test the function of the breakaway brake system. If the breakaway brake system is not working, do not tow the trailer, and have it serviced or repaired.**

Do not tow the trailer with the breakaway brake system activated or ON because the brakes will overheat which can result in permanent brake failure.

**⚠ WARNING**

**Failure to replace the pull pin will prevent brakes from working, leading to loss of control, serious injury, or death.**

If you do not use your trailer for three or more months, or during winter months:

- Store the battery indoors; and
- Charge the battery every three months.

Replace the breakaway brake system's battery according to the intervals specified by the breakaway brake system manufacturer.

### **3.2.1.6 - CONNECT THE ELECTRICAL CONNECTOR**

Connect the trailer lights to the tow vehicle's electrical system using the 7-pin connector (See Figure 3-8).



*Figure 3 - 8: 7-way RV Electrical Connection*

- Check all lights for proper operation.
  - Clearance and Running Lights (Turn on tow vehicle headlights).
  - Brake Lights (Step on tow vehicle brake pedal).
  - Turn Signals (Operate tow vehicle directional signal lever).
- Check brakes for proper operation using brake controller mounted in the cab.
- Repair or replace any inoperable lights before towing trailer.

If your trailer has brakes, your tow vehicle should have a brake controller that applies the trailer brakes. Before towing the trailer on the road, you must operate the brake controller while trying to pull the trailer in order to confirm that the brakes operate. While towing the trailer at less than 5 m.p.h., manually operate the brake controller in the tow vehicle cab. You should feel the operation of the trailer brakes.

## **WARNING**

**Improper electrical connection between the tow vehicle and the trailer will result in inoperable lights and electric brakes, and can lead to loss of control or collision.**

**Before each tow:**

- **Check to ensure all lights on trailer work.**
- **Check to ensure that the electric brakes work by operating the brake controller inside the tow vehicle.**

### **3.2.1.7 - UNCOUPLING THE BUMPER PULL TRAILER WITH BALL HITCH COUPLER AND TONGUE JACK**

- Unload the trailer.
- Block trailer tires to prevent the trailer from rolling.
- Disconnect the electrical connector.
- Disconnect the breakaway brake switch lanyard.
- Disconnect the safety chains (or cables) from the tow vehicle.
- Unlock the coupler and open it.
- Before extending jack, make certain the ground surface below the jack pad will support the tongue load.
- Extend the jack part way, replace the caster wheel & bail pin.
- Extend the jack to transfer the weight of the trailer tongue to the jack. Raise the trailer tongue until the coupler is above the hitch ball.
- Before moving tow vehicle double check to be sure there are no connections remaining from the trailer to the tow vehicle.

### **3.2.2 - GOOSENECK TRAILER WITH BALL COUPLER AND DROP-LEG JACK**

A gooseneck coupler on the trailer connects to a gooseneck ball that you must have installed in the bed of the tow vehicle. This system of coupling a trailer to a tow vehicle permits the tow vehicle to turn to sharper angles than are permitted by a bumper hitch system. A gooseneck coupler consists of a tube welded to a gooseneck ball receiver. Figure 3-9 shows a gooseneck trailer with a ball coupler.



*Figure 3 - 9: Gooseneck Trailer with Ball Coupler*

The load rating of the coupler and the necessary ball size are listed on the gooseneck.

You must provide a gooseneck ball and support structure that is marked with a rating that meets or exceeds the GVWR of your trailer and matches the size of the gooseneck ball receiver. If the gooseneck ball is too small, is underrated, is loose, or is worn, the trailer can come loose from the tow vehicle, and may lead to serious injury or death.

**THE TOW VEHICLE, SUPPORT STRUCTURE AND GOOSENECK BALL MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN THE TRAILER Gross Vehicle Weight Rating (GVWR).**

**IT IS ESSENTIAL THAT THE GOOSENECK BALL BE OF THE SAME SIZE AS THE GOOSENECK BALL RECEIVER.**

**IF THE GOOSENECK BALL IS TOO SMALL, IS UNDERRATED, IS LOOSE OR IS WORN, THE TRAILER CAN COME LOOSE FROM THE TOW VEHICLE, RESULTING IN SERIOUS INJURY OR DEATH.**

The gooseneck ball size and load rating (capacity) are marked on the ball; hitch capacity is marked on the hitch.



**⚠ WARNING**

**Coupler-to-hitch mismatch can result in uncoupling, leading to serious injury or death.**

**Be sure the load rating of the hitch ball is equal to or greater than the load rating of the coupler and the trailer's GVWR.**

**Be sure the size of the hitch ball matches the size of the coupler.**

A gooseneck trailer will have one or two jacks for raising and lowering the coupler. Because several drop leg jack mechanisms are available, the general instructions in this manual may vary slightly from the jack manufacturer's instructions. If the jack on your trailer does not resemble the jack shown in figure 3-10, follow the instructions provided by the jack manufacturer. If you do not have these instructions, call Shadow Trailers at 352-529-2190 for assistance.



*Figure 3 - 10: Drop-Leg Jack*

**3.2.2.1 - BEFORE COUPLING THE TRAILER TO THE TOW VEHICLE**

- Be sure the size of hitch ball matches the size of the coupler. Be sure the rating of the hitch and hitch ball matches or exceeds the rating of the coupler and the trailer's GVWR. Hitches, hitch balls, and couplers are marked with their size and rating.



- Wipe the hitch ball clean and inspect it visually and feel for flat spots, cracks and pits.

 **WARNING**

**A worn, cracked, or corroded gooseneck hitch ball can fail while towing, and may result in serious injury or death.**

**Before coupling trailer, inspect the gooseneck hitch ball for wear, corrosion, and cracks.**

**Replace worn or damaged gooseneck hitch ball before coupling the trailer.**

- Rock the ball to make sure it is tight to the hitch and locked in properly. Refer to your hitch manufacturer's instruction manual to ensure the ball is tight, properly seated, and locked in place and ready for towing.
- Wipe the inside and outside of the coupler and receiver clean and inspect it visually for cracks and deformations; feel the inside of the coupler for worn spots and pits. If any of these conditions exist, have the coupler replaced before coupling the trailer.
- Lubricate the hitch ball and the inside of the gooseneck coupler receiver with a thin layer of automotive bearing grease.
- Be sure the coupler is tight in the outer tube of the gooseneck. All coupler and related fasteners must be tight. Any visible signs of a loose fastener must be repaired before coupling the trailer.

 **WARNING**

**A loose gooseneck hitch ball can result in uncoupling, leading to serious injury or death.**

**Make sure the hitch ball is tight, properly seated, and locked in place before coupling the trailer. (Refer to hitch manufacturer's manual)**

- Release the jack handle / crank from its holder and push it onto the end of the shaft.
- Using the trailer's jack, raise the bottom surface of the coupler to be above the top of the gooseneck hitch ball.
- Block / Chock the front and rear of the rear trailer wheel on both sides of the trailer.

### **3.2.2.2 - PREPARING THE GOOSENECK COUPLER AND HITCH**

- Be sure that the release handle on the gooseneck coupler head moves freely by pulling the end of the release cable located on the driver's side of the Gooseneck Subframe routed through guide eyelets. If there are any signs of tightness grease the latching mechanism.
- If applicable, unlatch and lower the tow vehicle's tailgate.
- Slowly back up the tow vehicle so that the gooseneck ball is aligned under the gooseneck ball receiver.

#### **⚠ WARNING**

**Be sure no one is under the trailer or coupler during the coupling of the trailer to the tow vehicle.**

**Serious injury or death may occur if the trailer drops down.**

### **3.2.2.3 - COUPLE THE TRAILER TO THE TOW VEHICLE**

- Rotate the jack handle counter-clockwise. This will retract the jack causing the gooseneck ball receiver to drop down so it can fully engage the gooseneck ball and transfer the weight of the trailer tongue to the towing vehicle hitch. If the receiver does not line up with the ball, raise the receiver again and adjust the position of the tow vehicle. As the gooseneck coupler lowers onto the gooseneck hitch ball the release lever on the side of the coupler head will come up slightly as the latching mechanism slides over the ball. The release lever will go back down when the latching mechanism is low enough for it to reset to locked position. When the drop leg base is no longer resting on the ground, the towing vehicle hitch is holding all of the weight of the trailer tongue.
- When using a recessed ball, check to make sure handle and locking plates are clear of any interference, for instance, with safety chains and d-rings.
- For more information refer to coupler manufacturer's instructions in your trailer packet. If you do not have these instructions, call Shadow Trailers at 325-529-2190 for a free copy.
- Be sure the gooseneck coupler is all the way on the gooseneck ball and the locking mechanism is properly engaged. A properly engaged locking mechanism will allow the coupler to raise the rear of the tow vehicle. Using the trailer jack, test to see that you can raise the rear of the tow vehicle by 1 inch.

## **⚠ WARNING**

The gooseneck coupler must be **FULLY** seated and engaged onto the gooseneck hitch ball and securely latched before towing. Use  $2\frac{5}{16}$ " ball only. Failure to do so may result in serious injury or death.

## **NOTICE**

The drop-leg jack can be damaged by overloading. Do not use the drop-leg jack to raise the tow vehicle more than 1 inch.

**If the gooseneck coupler cannot be secured to the gooseneck hitch ball, do not tow the trailer.** Call your dealer or Shadow Trailers at 325-529-2190 for assistance.

- After testing to see that the receiver is properly secured and locked to the ball, retract the jack to its fully retracted position.
- Return the drop legs to their upper-most position. The drop legs are secured in the lowered position with a plunger pin. Rotating the plunger pin while pulling it outward and while supporting or holding the drop-leg from falling will cause it to come out of engagement with the drop leg and the leg will be free to rise.
- If the tow vehicle is equipped with a tailgate, raise it.
- Pick up the trailer wheel blocks/chocks.



*Figure 3 - 11: Drop-Leg Jack*

## **⚠ CAUTION**

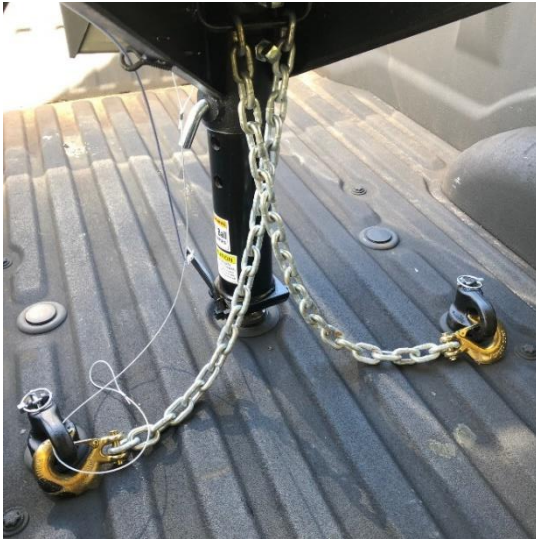
The drop legs are heavy and when the pin is pulled they may rapidly fall if not supported or held while disengaging the pin.

Keep your feet, shins, and hands clear of the drop legs and the drop leg bases when disengaging the drop leg pins.

When retracting the drop legs keep clear of the bottom of the outer tube of the drop leg jack as serious bruising, scrapes, or pinching may occur.

### **3.2.2.4 - RIGGING THE SAFETY CHAINS**

- Visually inspect the safety chains and hooks for wear or damage. Replace worn or damaged safety chains and hooks before towing.
- Rig the safety chains so that they attach to the “safety chain receivers” on the tow vehicle. If you are not certain of the hitch provisions for attaching safety chains, contact the hitch manufacturer or installer. Do NOT attach the safety chains to the gooseneck ball or its support (see Figure 3-12).
- Rig the safety chains so they have sufficient slack to permit turning, but not too much slack – the safety chains must keep the gooseneck on the tow vehicle bed if the trailer uncouples.



*Figure 3 - 12: GN Safety Chain Arrangement*

**⚠ WARNING**

**Improper rigging of the safety chains can result in loss of control of the trailer and tow vehicle, leading to serious injury or death, if the trailer uncouples from the tow vehicle.**

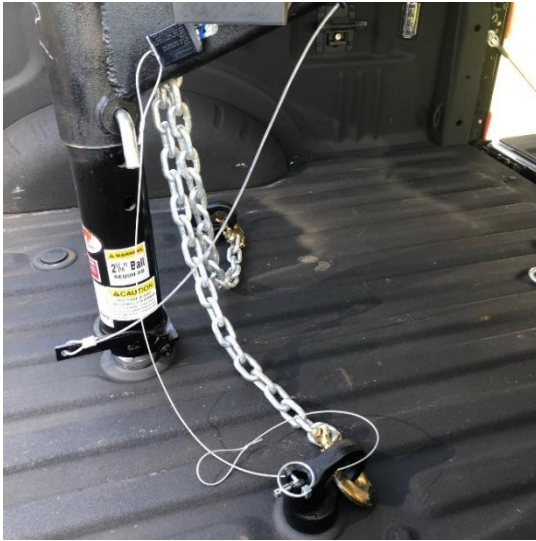
- **Fasten chains to the safety chain receivers on the hitch, not the ball.**
- **Have sufficient slack to permit turning and to keep the gooseneck on the bed of the tow vehicle if the trailer comes loose.**

**3.2.2.5 - ATTACH AND TEST THE ELECTRICAL BREAKAWAY BRAKE SYSTEM**

If the coupler or hitch fails, a properly connected and working breakaway brake system will apply the brakes on the trailer. The safety chains will keep the tow vehicle attached and as the trailer brakes are applied, the trailer/tow vehicle combination will come to a controlled stop.

The breakaway brake system includes a brake controller, battery and a switch with a pull pin and lanyard. Read and follow the instructions here as well as the instructions that have been prepared by the breakaway brake manufacturer. If you do not have these instructions, call Shadow Trailers at 352-529-2190 for a free copy.

The breakaway brake system is fitted with a “charging” capability that draws power from the tow vehicle. If the electrical system on your tow vehicle does not provide power to the breakaway brake battery, you must periodically charge the battery to keep the breakaway brake system in working order.



*Figure 3 - 13: GN Breakaway Brake Lanyard*

- Visually inspect the breakaway system for broken or missing parts. Repair or replace worn, damaged or missing parts before towing trailer.
- Connect the pull pin lanyard to the tow vehicle so the pull pin will be pulled out before all of the slack in the safety chains is taken up (See Figure 3-13). Do not connect the pull pin lanyard to a safety chain, safety chain receiver, gooseneck ball or its support. This would keep the breakaway brake system from operating when it is needed.
- To test the breakaway brake battery, remove the pull pin from the switch and attempt to pull the trailer forward. You should feel the trailer resisting being towed, but the wheels will not necessarily be locked. If the brakes do not function, do not tow the trailer until brakes, or breakaway brake system are repaired.
- Immediately replace the pull pin. The breakaway brake system battery discharges rapidly when the pull pin is removed.

**⚠ WARNING**

**An ineffective or inoperative breakaway brake system can result in a runaway trailer, leading to serious injury or death, if the coupler or hitch fails.**

**Connect the breakaway cable to the tow vehicle; and NOT to the safety chains/cables, safety chain receiver, gooseneck ball or gooseneck ball support.**

**Before towing the trailer, test the function of the breakaway brake system. If the breakaway brake system is not working, do not tow the trailer, and have it serviced or repaired.**

Do not tow the trailer with the breakaway brake system activated or ON because the brakes will overheat which can result in permanent brake failure.

**⚠ WARNING**

**Failure to replace the pull pin will prevent brakes from working, leading to loss of control, serious injury, or death.**

If you do not use your trailer for three or more months, or during winter months:

- Store the battery indoors; and
- Charge the battery every three months.

Replace the breakaway brake system's battery according to the intervals specified by the breakaway brake system manufacturer.

### **3.2.2.6 - CONNECT THE ELECTRICAL CONNECTOR**

Connect the trailer lights to the tow vehicle's electrical system using the 7-pin connector.

- Check all lights for proper operation.
  - Clearance and Running Lights (Turn on tow vehicle headlights).
  - Brake Lights (Step on tow vehicle brake pedal).
  - Turn Signals (Operate tow vehicle directional signal lever).
- Check brakes for proper operation using brake controller mounted in the cab.
- Repair or replace any inoperable lights before towing trailer.

If your trailer has brakes, your tow vehicle should have a brake controller that applies the trailer brakes. Before towing the trailer on the road, you must operate the brake controller while trying to pull the trailer in order to confirm that the brakes operate. While towing the trailer at less than 5 m.p.h., manually operate

the brake controller in the tow vehicle cab. You should feel the operation of the trailer brakes.

 **WARNING**

**Improper electrical connection between the tow vehicle and the trailer will result in inoperable lights and electric brakes, and can lead to loss of control or collision.**

**Before each tow:**

- **Check to ensure all lights on trailer work.**
- **Check to ensure that the electric brakes work by operating the brake controller inside the tow vehicle.**

Raise the tow vehicle tailgate.

### **3.2.2.7 - UNCOUPLING THE GOOSENECK TRAILER WITH BALL COUPLER AND DROP-LEG JACK**

Follow these steps to uncouple your gooseneck hitch trailer from the tow vehicle:

- Unload the trailer.
- Block / Chock the front and rear of the rear trailer wheel on both sides of the trailer.
- Disconnect the electrical connector.
- Disconnect the breakaway brake switch lanyard.
- Disconnect the safety chains from the tow vehicle.
- Before releasing drop leg jack, make certain ground surface below jack base will support the trailer tongue load.
- While supporting or holding the drop leg to prevent it from free falling, rotate the drop leg plunger pin handle so that the plunger pin is released from the drop leg.
- Manually lower the drop leg to down to the ground.
- Rotate the plunger pin handle so that the plunger pin is attempting to engage the drop leg.
- Manually lift the jack leg. The plunger pin will engage in the first available hole in the drop leg.



## **⚠ CAUTION**

**The drop legs are heavy and when the pin is pulled they may rapidly fall if not supported or held while disengaging the pin.**

**Keep your feet, shins, and hands clear of the drop legs and the drop leg bases when disengaging the drop leg pins.**

**When retracting the drop legs keep clear of the bottom of the outer tube of the drop leg jack as serious bruising, scrapes, or pinching may occur.**

- Be sure the plunger pin is fully engaged. Push it in by hand if necessary. The bent part of the plunger pin handle must be touching the plunger pin housing.
- If your trailer has two drop leg jacks, lower them both to the same level, following the above instructions.

## **NOTICE**

**If the drop legs are not set at the same level, one of the drop leg jacks can be overloaded and can be damaged. This can also cause damage to the trailer due to twisting of the trailer's structure.**

- Release the jack handle / crank from its holder and push it onto the end of the shaft.
- For single speed jacks, skip the following 3 steps.
- On two speed jacks, move the handle in or out to engage high gear.
- Rotate the crank handle clockwise to slowly extend the jack and transfer the weight of the trailer tongue to the jack.
- When the drop leg base contacts the ground, shift the gearbox into low gear.

## **NOTICE**

**Do not use high speed to lift the trailer, the drop leg jack mechanism can be damaged.**

**High speed is used only to rapidly move the drop leg base into contact with the ground.**

- Continue to extend the jack, making sure that the ground is providing stable and level support for the trailer.
- Lower the tow vehicle tailgate.

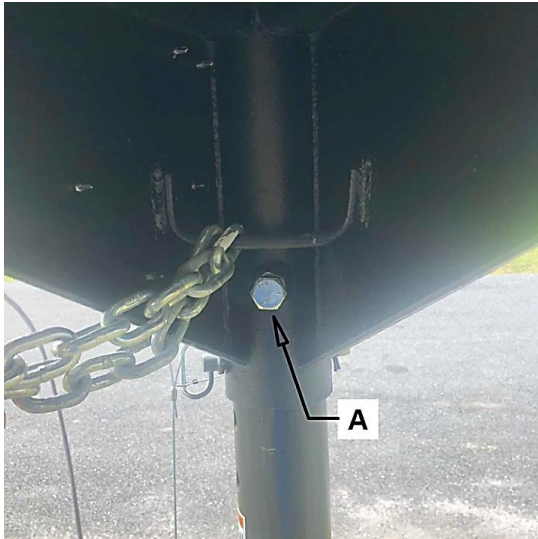
- After the jack is extended and the gooseneck ball receiver is well clear of the gooseneck ball, to permit driving the tow vehicle away, remove and stow the crank handle on its holder.
- Slowly drive the tow vehicle away from the trailer.
- Raise the tow vehicle tailgate.

### **3.2.2.8 - ADJUST GOOSENECK HITCH HEIGHT**

It is your responsibility to have the height of the coupler adjusted to match the height of the gooseneck ball in your tow vehicle. Proper coupler height adjustment is required to provide clearance between the bottom of the trailer and sides of the tow vehicle bed, to obtain level running of the trailer and to permit equal weight distribution on the axles. Your Shadow dealer is able to assist in the coupler height adjustment to match the trailer to your towing vehicle.

Loosen the jam nut and set screw (A) on the coupler (See Figure 3-14).

Remove retaining pin (B) and load bearing pin (C) (See Figure 3-15).



*Figure 3 - 14: GN Coupler Set Screw and Jam Nut*



Figure 3 - 15: GN Coupler Load Bearing Pin and Retaining Pin

Extend or retract the coupler as needed, but only using the load bearing pin holes pre-drilled in the gooseneck coupler tube as acceptable positions.

Fully insert load bearing pin (C) through one set of holes in coupler and outer tube. **NEVER use the set screw or any other device as a replacement for the load bearing pin (C).**

Install retaining pin (B) on load bearing pin (C).

Tighten setscrew (A) to 125 lb-ft of torque.

Tighten jam nut to 125 lb-ft of torque.

Check tightness after 50 miles of towing.

### **⚠ WARNING**

**Improper gooseneck height adjustment can result in overloading tires, blowout, and loss of control, leading to serious injury or death.**

**Adjust the gooseneck coupler height so that the trailer rides level. Be sure to maintain sufficient clearance between trailer neck and tow vehicle.**

## **4 - LOADING TRAILER**

Improper trailer loading causes many accidents and deaths. To safely load a trailer, you must consider:

- Overall load weight;
- Load weight distribution;
- Proper tongue weight; and
- Securing the load properly.

To determine that you have loaded the trailer within its rating, you must consider the distribution of weight, as well as the total weight of the trailer and its contents. The trailer axles carry most of the total weight of the trailer and its contents (Gross Vehicle Weight, or “GVW”). The remainder of the total weight is carried by the tow vehicle hitch. It is essential for safe towing that the trailer tongue and tow vehicle hitch carry the proper amount of the loaded trailer weight, otherwise the trailer can develop an undesirable sway at towing speeds, or the rear of the towing vehicle can be overloaded. Read the “Tongue Weight” information that follows.

The load distribution must be such that no component part of the trailer is loaded beyond its rating. This means that you must consider the rating of the tires, wheels and axles. For tandem and triple axle trailers, you must make sure that the front-to-rear load distribution does not result in overloading any axle.

Towing stability also depends on keeping the center of gravity as low as possible. Load heavy items on the floor and over the axles. When loading additional items, be sure to maintain even side-to-side weight distribution and proper tongue weight. The total weight of the trailer and its contents must never exceed the total weight rating of the trailer (Gross Vehicle Weight Rating, or “GVWR”).

### **WARNING**

**An overloaded trailer can result in failure or in loss of control of the trailer, leading to serious injury or death.**

**Never load a trailer so that the weight on any tire exceeds its rating.**

**Never exceed the trailer Gross Vehicle Weight Rating (GVWR).**

**Never exceed an axle Gross Axle Weight Rating (GAWR).**

### **4.1 - TONGUE WEIGHT**

It is critical to have a portion of the trailer load carried by the tow vehicle. That is, the trailer tongue must exert a downward force on the hitch. This is necessary for

two reasons. First, the proper amount of tongue weight is necessary for the tow vehicle to be able to maintain control of the tow vehicle/trailer system. If, for example, the tongue exerts an upward pull on the hitch, instead of pushing down on it (because the trailer is overloaded behind its axle(s)), the rear wheel of the tow vehicle can lose traction or grip and cause loss of control. Also, even if there is some weight on the tongue, but not enough weight on the tongue, the trailer can become unstable at high speeds. Remember, the faster you go, the more likely the trailer is to sway.

If, on the other hand, there is too much tongue weight, the tow vehicle is prone to jack-knife. Furthermore, the front wheels of the tow vehicle can be too lightly loaded and cause loss of steering control and traction, if the front wheels are driving.

In addition to tow vehicle control, tongue weight is necessary to ensure that the trailer axle(s) do not exceed their Gross Axle Weight Rating (GAWR).

In the following table, the second column notes the rule of thumb percentage of total weight of the trailer plus its cargo (Gross Vehicle Weight, or "GVW") that should appear on the tongue of the trailer. For example, a trailer with a gooseneck hitch, with a loaded weight of 12,000 pounds, should have 20-25% of 12,000 pounds on the tongue. That is, the example trailer would have 2,400 to 3,000 pounds on its tongue.

Typical Tongue Weight as a Percentage of Loaded Trailer Weight	
Type of Trailer	Percentage
Bumper Pull / Tagalong	10%-15%
Gooseneck	20%-25%
Gooseneck with Living Quarters	30%-35%

Table 4 - 2

**⚠ WARNING**

**An improperly distributed load can result in loss of control and can lead to serious injury or death.**

**Proper tongue weight is essential for stable trailer handling.**

**Distribute the load as necessary, front to rear, to provide proper tongue weight.**

**Distribute the load evenly, left to right, to avoid tire overload.**

**Keeping the center of gravity low and centered is essential to minimize the risk of tip-over.**

#### **4.1.1 - CHECKING TONGUE WEIGHT**

To check the tongue weight, the tow vehicle and trailer must be on level ground, as they will be when the trailer is being towed.

For lighter trailers the recommended method of checking tongue weight is to use an accessory called a “tongue weight scale.” If a tongue weight scale is not available from your dealer, call Shadow Trailers at 352-529-2190 for assistance.

#### **WARNING**

**An unrestrained trailer can fall off its support, resulting in serious injury or death.**

**Before checking tongue weight, block/chock trailer wheels, front and rear.**

For most trailers it is easier to go to a truck stop where there is a “certified” scale. Pull the trailer onto the scale and decouple it from the tow vehicle, leaving just the trailer on the scale. Get a “ticket”, which lists the total trailer weight. Reconnect the trailer to your tow vehicle and drive the tow vehicle wheels off the scale, just leaving the trailer axles on the scale. Get a second “ticket”, which lists the trailer’s axle weight. Simple subtract the axle weight from the total weight to determine the hitch weight.

It is also desirable, while you are at the scale, to weigh the entire combination vehicle. This result should be less than the Gross Combined Weight Rating (GCWR) for your towing vehicle. Some scales allow you to get individual axle weights also. If this is possible, get the tow vehicles front and rear axle weights to make sure they are in the same proportion as the tow vehicle alone, and that the rear axle is not overloaded.

#### **4.2 - SECURING CARGO**

You are responsible to secure your cargo in such a way that it does not shift within the trailer, while the trailer is being towed. The “ride” inside a trailer can be very bumpy and rough.

#### **WARNING**

**A shifting load can result in failure, or to loss of control of the trailer, and can to serious injury or death.**

**You must tie down all loads with proper sized fasteners, ropes, straps, etc. to prevent the load from shifting while trailering.**

### **4.3 - LOADING CARGO (ENCLOSED TRAILER)**

Couple the trailer to the tow vehicle before loading. The tongue of a bumper pull trailer can rise during loading, before the cargo is properly distributed.

Depending on the exact model of your Shadow Trailer, the cargo carrying portion may be designed for carrying such things as:

- A car
- Snowmobiles
- All-Terrain Vehicles (ATVs)
- Motorcycles

Do not transport people, containers of hazardous substances, cans or containers of flammable substances. However, fuel in the tank of an offroad vehicle, or a car or motorcycle, etc., may be carried inside of your enclosed cargo trailer.

#### **WARNING**

**Never transport people inside your trailer, even if it has a living quarters. The transport of people puts their lives at risk and may be illegal.**

#### **WARNING**

**Do not transport flammable, explosive, poisonous, or other hazardous materials in your trailer.**

**Exceptions:**

- **Fuel in the tanks of vehicles that are being towed.**
- **Fuel stored in proper containers used in living quarters for cooking.**
- **Fuel stored in the tank of an on-board generator.**
- **Fuel in other factory installed fuel tanks.**

#### **4.3.1 - PREPARING THE TRAILER FOR LOADING**

Before loading cargo into your enclosed trailer, inspect the interior of the trailer. Enclosed trailers may be fitted with “D”-ring hold-downs, and/or a track system that can be used to secure the cargo. Inspect the “D”-rings and track system for looseness or signs of bending before loading the cargo onto the trailer.

**⚠ WARNING**

**Damaged or loose "D"-rings can break, allowing cargo to become loose inside the trailer. Loose cargo can shift the center of gravity, and result in loss of control of the trailer.**

**Inspect "D"-rings, and test them for looseness before loading cargo.**

**Do not use a damaged or loose "D"-ring to secure cargo.**

#### **4.3.2 - LOADING THE ENCLOSED TRAILER**

Enclosed trailers may be fitted with a drop ramp door. The weight of the drop ramp door may be partially held by a spring and cable counterbalance assembly. If this assembly is out of adjustment or worn out, it will not provide the expected assistance for slow and careful lowering and raising of ramp.

**⚠ WARNING**

**A spring and cable counterbalance can inflict serious injury if it breaks, or if incorrectly adjusted. Stand clear when opening the ramp door.**

**Inspect the cable and cable ends each time the ramp door is operated.**

**DO NOT attempt to service the counterbalance. Take the trailer to your Shadow Trailer dealer or trailer service facility for service.**

Carefully lower the drop ramp to the ground. Load the cargo up the drop ramp and into the trailer, with approximately 60% of the cargo in the front half of the trailer. If the trailer has living quarters, the cargo area of your trailer will have ventilation openings or windows. Do not block these ventilation openings or windows. These openings are provided to exhaust potentially deadly fumes.

**⚠ WARNING**

**Accumulation of hazardous fumes can cause serious injury or death.**

**Do not block ventilation ports.**



Secure the cargo to the trailer using appropriate straps, chains, and tensioning devices. Close the drop ramp door and secure the trailer door catch using a linchpin or other locking device, so that the catch and door cannot open while the trailer is being towed.

**⚠ WARNING**

**If the door opens, your cargo may be ejected onto the road, resulting in serious injury or death.**

**Always secure and lock the door latch(es) after closing.**

**4.4 - LOADING HORSES (HORSE TRAILER)**

Couple the trailer to the tow vehicle before loading. This is essential for the bumper pull trailer because the tongue of a bumper pull trailer can rise during loading, before the cargo is properly distributed. The cargo-carrying portion of a horse trailer is designed only for carrying horses. Do not transport people, livestock, containers of hazardous substances, or containers of flammable substances.

**⚠ WARNING**

**Never transport people inside your trailer, even if it has a living quarters. The transport of people puts their lives at risk and may be illegal.**

**⚠ WARNING**

**Do not transport "loose" livestock in your horse trailer. They can cause the trailer to become unstable and can result in loss of control.**

**Use a trailer designed to transport "loose" livestock.**

 **WARNING**

**Do not transport flammable, explosive, poisonous, or other hazardous materials in your trailer.**

**Exceptions:**

- **Fuel in the tanks of vehicles that are being towed.**
- **Fuel stored in proper containers used in living quarters for cooking.**
- **Fuel stored in the tank of an on-board generator.**
- **Fuel in other factory installed fuel tanks.**

Before loading a horse in your trailer, inspect the interior of the trailer. The interior of the trailer must be smooth, and have no protruding objects. There should be no loose objects that could move about and startle or injure the horse. Check the walls, floor, dividers, etc., for loose and broken parts, welds, hinges, etc.

#### **4.4.1 - PREPARING THE HORSE TRAILER FOR LOADING**

Open windows and vents to provide ventilation. Consider the weather and transport conditions (i.e., on warm sunny days, maximum ventilation is required). Do not carry a horse without providing ventilation, even in the coldest of weather. Ventilation is critical for the well-being of your horses. Know your horses and adjust ventilation for your horses' comfort.

Be sure pivoting window latches are in a flush position, so they do not present a protrusion that can injure your horse.

Tighten or replace any loose or protruding screws or rivets in the walls.

Remove or secure loose objects, (i.e., butt bars, saddles, tack and equipment) so that items will not move during towing.

Inspect for cracks at the welds on the divider hinges, and the welds on the tie rings. If you are able to open any cracks in or near these welds by lifting the dividers or by twisting the tie rings, have the weld repaired before loading your horses.

**⚠ CAUTION**

The trailer's interior may contain hazards to a horse that can result in its serious injury or death.

Before loading a horse, inspect the trailer's interior and adjust or repair all loose, sharp, or protruding features such as handles, loose or broken parts of the trailer, etc.

Before towing trailer:

- Lock/latch all stall dividers
- Be sure all saddles, tack and equipment, as well as horse(s), are prevented from being thrown about in transit.

**⚠ WARNING**

Improper weld repair will lead to early failure of the trailer structure and can cause serious injury or death.

Do not repair cracked or broken welds unless you have the skills and equipment to make a proper repair. Have the welds repaired by your Shadow Trailer dealer or a capable repair facility.

#### **4.4.2 - LOADING THE HORSE TRAILER**

The trailering of horses introduces many variables that are not present in the trailering of non-living cargo. Horses are prone to take flight when they feel threatened or pain. In the confines of a trailer, the flight response can cause serious injury or death to a human handler. Even experienced and docile horses can be frightened.

Horses must be slowly acclimated to trailering. Be sure the horse's first trips are short trips, so you can gauge its reaction. Some will take to the experience easily, but others will strongly protest. You must act according to your horse's demeanor.

**⚠ WARNING**

**When a horse is frightened it is capable of inflicting serious injury or death to a human handler.**

**Know your horse's temperament before attempting to trailer it.**

**Handling a horse that is not trailer-acclimated may result in injury or death, or damage to the trailer.**

**Do not haul an unbroken horse in this trailer.**

**Horses must have a halter.**

1. If the trailer has living quarters, close and lock the door between the living quarters and the horse area.
2. If your trailer is fitted with swinging loading doors, open them fully and secure them open using the door holdbacks.
3. If the trailer is fitted with a drop ramp, carefully lower it to the ground.
4. Open all stall dividers to their OPEN (against the wall) position.
5. Trailer with a folding rear tack will be equipped with a telescopic divider at the rearmost position. Push the telescoping portion into the fixed body of the divider to prevent obstruction of the loading pathway.
6. Some trailers have a folding rear tack room wall. Folding up the tack room wall against the outer wall creates a larger opening at the rear of the trailer to assist the loading. After loading, return and secure the wall to normal position for travel.
7. Lead the horse into the trailer by a halter or lead rope. If the horse shows any signs of distress, stop loading, and calm the horse.

**⚠ WARNING**

**Improper weight distribution of the horses in the trailer will result in an unstable trailer.**

**Always load the first horse into the forward-most stall.**

8. Tie the horse to the trailer interior by tying the lead rope to the tie ring, or other facility provided on the trailer wall for attachment of the lead rope. A rule of thumb is to leave about 18 inches of free rope between the attachment point on the trailer and the horse. The layout of the Shadow horse trailer has been designed to safely contain your horse. The trailer is equipped with stall dividers and tie rings to secure the horse, and has a rubber floor mat to keep shod horses from slipping on

the wood or metal floor. Restraining a horse without using a combination of a tie-strap and stall divider may result in serious injury or death to the horse.

 **CAUTION**

**Failure to secure a horse using a tie strap may result in its serious injury or death.**

9. Close and latch the stall divider.
10. If additional horses are to be loaded, repeat above steps 7-9 for each horse – lead the horse, secure the horse, close and latch the stall divider.
11. After the last horse has been loaded, close and latch any unused dividers in the CLOSED (across the trailer) position.
12. Double check that each horse is tied to the trailer and each stall divider is LATCHED in the CLOSED position.
13. If your trailer is fitted with a butt bar or butt strap to keep the horse away from the door, secure or pin the butt bar in place.
14. Close the trailer. Release the door holdbacks and swing the hinged doors to the closed position, and, if applicable, raise the drop ramp. OR, raise the drop ramp, and release the dutch doors and swing the hinged doors to the closed position.
15. Secure the trailer door catch with a linchpin or similar device, so that the catch and door cannot open while the trailer is being towed. OR, if equipped, lock the locking handle hasp.

 **WARNING**

**Always secure the door latch(es) after closing. Place a linchpin in the catch(es) if possible. Lock the deadbolt(s) if possible.**

**If the door(s) opens, your cargo may be ejected on the road, resulting in serious injury or death to the animals (if applicable) or other drivers.**

16. If your trailer is fitted with drop feed windows, close and lock them. Always keep one hand in contact with the feed door while closing (See Figure 4-1).



Figure 4 - 1: Drop Feed Window

**⚠ CAUTION**

**Risk of head injury.**

**Stay clear of drop feed window or safety bar grill when opening or closing. Maintain contact with window or safety bar grill when opening or closing. After closing drop feed window and safety bar grill, verify each are securely latched.**

17. Check the horses after 5 to 10 miles or 10 minutes of towing, and then at least once per hour thereafter. Open a feed door or other access and look for signs of stress, cuts, or injury. On long trips it is recommended that horses be removed from the trailer every 6-10 hours for exercise, food and watering.

**⚠ WARNING**

**Horses may kick when back door is opened.**

**Stay clear when opening the back door.**

## **4.5 - LOADING LIVESTOCK (LIVESTOCK TRAILER)**

Couple the trailer to the tow vehicle before loading. This is essential for the bumper pull trailer because the tongue of a bumper pull trailer can rise during loading, before the cargo is properly distributed.

The cargo-carrying portion of a livestock trailer is for carrying livestock (other than horses) only. The livestock trailer does not have the equipment required for the safe transport of horses, e.g., stall dividers, tie rings and a rubber floor mat. Do not transport people, containers of hazardous substances, or containers of flammable substances.

### **WARNING**

**Never transport people inside your trailer, even if it has a living quarters. The transport of people puts their lives at risk and may be illegal.**

### **CAUTION**

**Hauling a horse in a livestock trailer may result in its serious injury or death.**

**Do not carry a horse in a livestock trailer. Use a trailer designed to carry horses.**

### **WARNING**

**Always secure the door latch(es) after closing. Place a linchpin in the catch(es) if possible. Lock the deadbolt(s) if possible.**

**If the door(s) opens, your cargo may be ejected on the road, resulting in serious injury or death to the animals (if applicable) or other drivers.**

### **CAUTION**

**Risk of head injury.**

**After closing drop feed doors, verify doors are properly latched.**

## **WARNING**

**Do not transport flammable, explosive, poisonous, or other hazardous materials in your trailer.**

**Exceptions:**

- **Fuel in the tanks of vehicles that are being towed.**
- **Fuel stored in proper containers used in living quarters for cooking.**
- **Fuel stored in the tank of an on-board generator.**
- **Fuel in other factory installed fuel tanks.**

### **4.5.1 - PREPARING THE LIVESTOCK TRAILER FOR LOADING**

Before loading livestock in your livestock trailer, inspect the interior of the trailer. The interior of the trailer must be smooth, and have no protruding objects, such as bolts, broken parts of trailer interior, etc. A protruding object can injure your livestock.

Tighten or replace any loose or protruding bolts, screws, or rivets in the walls.

Remove or secure loose objects, so no items will move during towing.

## **CAUTION**

**The trailer's interior may contain hazards to livestock that can result in its serious injury or death.**

**Before loading livestock, inspect the trailer's interior and adjust or repair all loose, sharp, or protruding features such as handles, loose or broken parts of the trailer, etc.**

**Before towing trailer be sure all tack and equipment, as well as livestock, are prevented from being thrown about in transit.**

### **4.5.2 - LOADING THE LIVESTOCK TRAILER**

The trailering of livestock introduces many variables that are not present in the trailering of non-living cargo. Livestock may resist being loaded into a trailer.



 **WARNING**

**Large animals are a capable of inflicting serious injury or death to a human handler.**

**Know your animals' temperament before attempting to trailer them.**

1. Position the trailer as needed to load the livestock.
2. If the trailer is fitted with a drop ramp, carefully lower it to the ground.
3. Open and secure the loading door.
4. Open and secure the interior gates as necessary.
5. Load the livestock into the trailer.
6. Gate the livestock tightly to keep them from moving or falling during transportation.
7. Close the loading doors and raise the drop ramp if equipped.
8. Secure the trailer door/ramp so that the catch and door cannot open while the trailer is being towed.

 **WARNING**

**Always secure the door latch(es) after closing. Place a linchpin in the catch(es) if possible. Lock the deadbolt(s) if possible.**

**If the door(s) opens, your cargo may be ejected on the road, resulting in serious injury or death to the animals (if applicable) or other drivers.**

## **5 - CHECKING TRAILER BEFORE/DURING EACH USE**

### **5.1 - PRE-TOW CHECKLIST**

Before towing, double-check all of these items:

- Tires, wheels and lug nuts (see “MAJOR HAZARDS”, Section 2.2 of this manual).
- Tire Pressure. Inflate tires on trailer and tow vehicle to the pressure stated on the Certification / VIN label.
- Coupler secured and locked (see “COUPLING TO THE TOW VEHICLE”, Section 3 of this manual).
- Safety chains properly rigged to tow vehicle, not to hitch or ball (see “COUPLING TO THE TOW VEHICLE”, Section 3 of this manual).
- Test Tail, Stop, and Turn Lights.
- Test trailer brakes.
- Safety breakaway switch lanyard fastened to tow vehicle, not to safety chains (see “COUPLING TO THE TOW VEHICLE”, Section 3 of this manual).
- Cargo properly loaded, balanced and secured.
- Tongue weight and weight distribution set-up.
- Doors and gates latched and secured.
- Fire extinguisher.
- Flares and reflectors.

### **5.2 - MAKE REGULAR STOPS**

After each 50 miles, or one hour of towing, stop and check the following items:

- Coupler secured.
- Safety chains are fastened and not dragging.
- Cargo secured.
- Cargo door latched and secured
- Check tires for signs of abnormal wear and loss of air pressure.

## **6 - BREAKING IN A NEW TRAILER**

### **6.1 - CHECK LUG NUTS AT FIRST 10, 25, & 50 MILES**

Wheel lugs can shift and settle quickly after being first assembled, and must be checked after the first 10, 25, and 50 miles of driving. Failure to perform this check may result in a wheel coming loose from the trailer, causing a crash leading to death or serious injury. Refer to the "INSPECTION, SERVICE, & MAINTENANCE", section 8 of this manual for the proper tightening sequence and torque value for the wheel lug nuts (bolts).

#### **WARNING**

**Lug nuts are prone to loosen after being first assembled. Serious injury or death can result.**

**Check lug nuts for tightness on a new trailer, and after re-mounting a wheel at the first 10, 25, & 50 miles.**

### **6.2 - BREAKING IN ELECTRIC DRUM BRAKES**

It is typical for new electric drum brakes to be less effective than full performance until the break-in process is performed.

It can take 20-50 brake applications to effectively complete the break-in process. Using the in-cab brake controller to manually activate the trailer brakes only, slow the trailer and tow vehicle from 40 mph to 20-25 mph using only the trailer brakes. To prevent overheating the brakes be sure to allow time to cool the brakes after each application during this process; 1-2 miles should suffice. The driver should feel a noticeable difference in the brake performance during this period, sometimes in as few as 10 applications. After 50 applications the brake shoes and electromagnets should be fully seated to the brake drum for full performance.

### **6.3 - ADJUST BRAKE SHOES AT FIRST 200 MILES**

#### **WARNING**

**Brakes that are out of adjustment can result in serious injury or death.**

**Brakes must be adjusted at the intervals specified.**

Brake shoes and drums experience a rapid initial wear. The brakes must be adjusted after the first 200 miles of use, and each 3,000 miles thereafter. Some axles are fitted with a mechanism that will automatically adjust the brake shoes. Read your axle and brake manual to see if your brakes must be adjusted manually or if they adjust automatically. If you do not have the axle and brake manual, call Shadow Trailers at 352-529-2190 for assistance.

For manual brake shoe adjustment procedure please refer to your axle and brake manufacturer's manual.

## **6.4 - SYNCHRONIZING THE BRAKE SYSTEMS**

Trailer brakes are designed to work in synchronization with the brakes on the tow vehicle. When the tow vehicle and trailer braking systems are synchronized, both braking systems contribute to slowing, and the tongue of the trailer will neither dive nor rise sharply.

### **WARNING**

**If trailer and tow vehicle brakes do not work properly together, serious injury or death can occur.**

**Road test the brakes in a safe area at no more than 30 mph before each tow.**

To ensure safe brake performance and synchronization, read and follow the axle/brake and the brake controller manufacturers' instructions. If you do not have these instructions, call Shadow Trailers at 352-529-2190 for a free copy.

## **6.5 - TIRE PRESSURE**

Check tire pressures on both the trailer and tow vehicle. Inflate to the value indicated on the Certification /VIN label.

## **7 - ACCESSORIES**

This section provides some basic information for the safe operation of several accessories. For many accessories, such as generators and LP appliances, the manufacturer of the accessory has also provided instructions. You must read and follow those instructions before using the accessory. If you are uncertain whether you have all of the instructions, call Shadow Trailers at 352-529-2190 or your dealer before operating the accessory. The following accessories are described in this section:

- Gasoline (or LP) and Diesel Generators
- Accessory Battery
- “Shore Power” connections which provide power by “plugging the trailer in” to an external source of electrical power
- LP Gas Fuel System
- Recessed Door Latches
- Bar Lock & Locking Handle Hasp
- Vending or Accessory Doors
- Electric Tongue Jack
- Hydraulic Jack(s)
- Windows
- Drop Feed Windows
- Slant Load Stall Dividers
- Doors, Gates, and Ramps
- Small Animal Pens
- Removable Center Post
- Straight Load Dividers
- Swing-out Saddle Rack
- Rear Tack Compartment
- Front Walk-In Tack Room

Some accessories introduce the risk of fire and carbon monoxide poisoning. Make sure you have a fire extinguisher charged and ready. Check the fire extinguisher at least once a month. If the fire extinguisher is discharged even partially, it must be recharged. Follow the fire extinguisher manufacturer's instructions for recharging the extinguisher after use.

### **7.1 GASOLINE, LP, OR DIESEL-POWERED ELECTRIC GENERATORS**

If your trailer is equipped with a generator, you must have and follow the generator manufacturer's instructions. Carbon monoxide gas is present in the exhaust of all gasoline and diesel engines, as well as from other burning fuels such as LP gas and charcoal.

Carbon Monoxide is an odorless gas that can cause death. Be certain exhaust from any running engine or burning fuels cannot accumulate in areas where

people or animals are likely to be present. Conditions that can redirect exhaust fumes are, for example:

- Being drawn in by fans or ventilators operated in a trailer;
- Prevailing wind;
- Being trapped between adjacent trailers, vehicles or buildings; or
- Being trapped between or in a snow bank or other materials that can redirect fumes

You must have an operating carbon monoxide detector inside the accommodation spaces of your trailer.

 **WARNING**

**Gasoline, LPG, and diesel generators pose a risk of death from:**

- **Carbon Monoxide**
- **Fire and Explosion**
- **Electrocution**

**Do not operate a generator without having a working carbon monoxide detector.**

**Do not refuel a running generator.**

**Do not refuel near ignition sources.**

Before starting the generator, check fuel and oil levels. The generator may have to run for one or two minutes before it allows drawing electricity from it. Read the generator instruction manual. Never exceed the capacity of the generator.

Before turning off the generator, remove the electrical load and let the engine to run for a few minutes to cool the generator.

## **7.2 - ACCESSORY BATTERY**

Your trailer may be outfitted with an accessory battery that operates lighting, electric/hydraulic landing gear, fans, or other accessories. An accessory battery may be kept charged either by the tow vehicle, a 12V automotive battery charger/battery tender, or, if equipped, shore power or generator via the 12V converter.

A disconnect switch may be provided to disconnect the accessory battery when you do not plan to be using the trailer for an extended period, such as seasonal storage. If there is no disconnect switch, then remove the cables from the battery terminals.

The accessory battery must be kept in a charged condition during storage. The battery could freeze and break if it becomes discharged.

### **7.3 - SHORE POWER**

Shore power is the delivery of electrical power from another source to a power inlet on your trailer. To connect your trailer to this source, you must have a “shore power” cord, specifically designed for this use. **DO NOT USE AN ORDINARY EXTENSION CORD.**

The trailer end of this cord is connected to an electrical inlet on the trailer, sometimes referred to as a “motor base.” The 110V power then goes into an electrical distribution box and sometime a power converter. This box contains circuit breakers and/or fuses and may include a power converter to change the shore power (usually 110 volts alternating current) into 12 volts direct current.

Do not assume that a shore power supply is correctly wired. Shore power may have incorrect polarity or not have the safety ground. Before connecting your trailer, test shore power by using a polarity and ground tester, or have an electrician test the power source.

If you have shore power, your trailer may be fitted with Ground-Fault Circuit Interrupting outlets (GFCI). If you have GFCI protection, you must periodically test the outlets by pressing the “TEST” button that is located on the GFCI equipped outlet. This process will “trip” the outlet, to reset it, push the “RESET” button located next to the “TEST” button.

#### **WARNING**

**Shore power poses a risk of death due to electrocution.**

**Always use an electrical cord specifically designed for shore power connection.**

**Never use an ordinary extension cord.**

**Always connect the shore power cord to a grounded source.**

**Never use a shore power cord that is altered or damaged.**

**Connect only to source of correct voltage. Make certain polarity is correct.**

**Do not overload electrical circuits and always replace fuses or circuit breakers with the correct rating.**

**⚠ WARNING**

**Risk of fire.**

**Connect only to source of correct voltage.**

**Do not overload electrical circuits.**

**Do not use an ordinary extension cord to connect to shore power.**

**Replace fuses with like rating.**

## **7.4 - LP GAS FUEL SYSTEM**

LP gas systems are installed to operate a variety of appliances, such as stoves, refrigerators, heating units and electrical generators. The exhaust fumes from burning LP gas contain carbon monoxide. Carbon monoxide gas is odorless and can cause death or serious injury if inhaled. The exhaust from LP appliances must be directed to the outdoors. You must have an operating carbon monoxide detector in the accommodation space of your trailer.

**⚠ DANGER**

**You can die or be brain damaged by Carbon Monoxide.**

**Make certain the exhaust from LP appliances is directed to the outdoors.**

**Have a working carbon monoxide detector in the living quarters' accommodation spaces of your trailer before operating any LP gas appliance.**

**Do not operate portable grills, portable stoves, portable lanterns, or portable heaters inside the trailer.**

When used for the first time, or after a period of storage, the LP gas lines will be full of air and must be purged of air, before the appliances will stay lit. Have the LP gas lines purged by your trailer dealer, or an LP gas dealer. An LP gas system is designed to operate with a supply of LP gas only, NOT natural gas. A natural gas supply is unsafe for the system's pressure regulation devices.



 **WARNING**

**Risk of death due to fire or explosion.**

**Do not store LP tanks inside the trailer.**

**Only fill the tanks with liquified petroleum gas.**

**Do not connect natural gas to this system.**

**Only fill a propane tank 80% full. Overfilled tanks can release gas and cause an explosion.**

**Extinguish all pilot lights and turn off all appliances before refilling fuel or LP gas tanks.**

Keep the shutoff valve on your LP gas tank closed at all times, except when you are operating an LP gas appliance. Before opening the LP shutoff valve, turn off all LP gas appliances. If an appliance is on when you open the shutoff valve, LP gas can accumulate in the trailer, which can result in an explosion.

Do not use a wrench to open or close the shutoff valve. If the shutoff does not completely stop the flow of LP gas when it is hand-tightened, replace the shutoff valve.

LP gas leaks can result in fire or explosion. If your trailer is equipped with an LP gas system, it must also be equipped with an LP gas detector. The LP gas detector will be located near the floor to detect the heavier-than-air LP gas. If a leak is suspected, use a soapy water solution to search for the leak. Do not use a solution that contains ammonia or chlorine (common in window and other household cleaning compounds), because those chemicals will cause LP piping corrosion.

## **WARNING**

**Risk of fire or explosion.**

**If LP gas is detected (by smell or by the LP gas detector):**

- **Do not touch electrical switches;**
- **Extinguish flames and pilot lights;**
- **Open doors and windows for ventilation;**
- **Shut off gas supply at the tank; and**
- **Leave the area until odor clears.**

**Correct the source of LP gas leakage before using LP appliances.**

**Do not use a flame to locate the source of an LP gas leak.**

LP gas is either propane or butane that is compressed into liquid form. LP gas must be completely vaporized before being burned. Butane gas will not operate if the outside temperature is below 32 degrees Fahrenheit.

## **NOTICE**

**Use Butane only when the temperature is above freezing (32°F).**

**Propane gas will operate at temperatures as low as minus 44 degrees Fahrenheit (-44°F)**

Keep the regulator for the LP gas system (located near the LP gas tank) covered with a guard to protect it from road debris.

LP gas is prohibited on some roadways, bridges and tunnels. Check a map and with Department of Transportation (or with the AAA) for travel routes that do not have such restrictions.

### **7.4.1 - LP GAS SYSTEM TROUBLESHOOTING**

Having liquid “gas” at your appliance is an indication that the LP gas tank is overfilled, or that the temperature is too cold.

If your LP gas appliances do not stay lit, it might be because your LP gas system is contaminated with air or moisture. Many LP gas vendors have facilities to purge the air from an LP gas system.

If your LP gas system is not providing gas, even when the shutoff valve is open, it might be because the LP gas regulator has frozen water in it.

**⚠ WARNING**

**Risk of fire or explosion.**

**Never use a flame, heat lamp, or hair dryer to thaw an LP regulator. Use an incandescent light bulb.**

**Do not remove the regulator cover or attempt to service the LP regulator.**

**7.5 - RECESSED DOOR LATCHES**

Recessed travel trailer latches are used on: manger doors, access doors, front tack room doors, cargo entry doors, living quarter entry doors, etc. Open the latch by pulling out on the recessed paddle handle of the latch and pull the door toward you. (See Figure 7-1)



*Figure 7 - 1: Opening a Travel Trailer Door Latch*

To close the door, place your hand on the door next to the latch and firmly push the door closed. The door will latch with a clicking sound. (See Figure 7-2)



*Figure 7 - 2: Closing a Travel Trailer Door Latch*

Check to make sure the door has latched by inspecting the play in the latch paddle. This can be done by gently feeling how much movement is remaining in the paddle after it has latched. A properly latched paddle will have no more movement than (about one sixteenth of an inch) what is felt when the paddle latch is in a neutral position, such as when the door is in an open position. Any excess movement means the spring-loaded catch bolt is not fully engaged in the striker plate, and the door should be re-shut and or adjusted until proper latching is achieved.

Some latches are equipped with a lock tumbler on the handle, some are equipped with a lock tumbler in the housing of the latch. The latches that have a tumbler on the handle will lock the handle itself to prevent entry (these are found on manger doors, access doors, and baggage style doors). The latches that have tumbler on the latch housing will be equipped with a deadbolt (these are found on all tack room doors, living quarters doors, and cargo area entry doors). The deadbolt must be locked before travel to ensure the door does not come open in transit.

After latching travel trailer latch, it is recommended to lock all doors when in transit for safety and security reasons. (Note: With the door open, before attempting to lock the latch, determine which way the tumbler must be turned to lock the latch.) This can be done by inserting your key into the tumbler on the latch, and turn the tumbler one quarter turn until it stops, then remove key, to unlock turn the lock tumbler the opposite direction. Verify that you have properly locked the latch by attempting to open the door. Once you have verified the door is locked, push the door next to the latch to ensure the catch bolt is properly seated into the striker plate/latching hole.

## **7.6 - BAR LOCK AND LOCKING HANDLE HASP**

Bar lock latches are commonly used in a vertical position on rear load and tack area doors, side escape doors and in a horizontal position on some ramp doors. Bar lock latches consist of a 1" pipe extending the height or width of a door or ramp, held in place by top, center, and bottom upper and lower bearing plates, "claws" on each end of pipe latch into keepers mounted onto the trailer body/frame. The complete assembly is controlled by a center mounted pivoting handle that latches into a handle hasp (See Figure 7-3).



*Figure 7 - 3: Rear Doors with Bar Locks*

To open the bar lock latch, release the handle from the locking hasp by tipping the center catch away from the handle, then raise the handle up and free from the locking hasp. Once the handle clears the locking hasp pull the handle out from the door rotating the pipe and in turn rotating the claw clear from the keepers (See Figures 7-4, 7-5 and 7-6). Because a bar lock latch spans the full height of the door and ties the top and bottom of the door opening together, it is the strongest most secure type of door latch available for doors that are located at the animal area. To close the bar latch reverse the above procedure, being sure that both the top and bottom claws and keepers are fully engaged.



*Figure 7 - 4: Release Hasp Catch*



*Figure 7 - 5: Lift Handle Up and Rotate Outward*



*Figure 7 - 6: Claw and Keeper Fully Disengaged*

When replacing the handle into the locking hasp, be sure the handle fully engages with the catch center bar until it snaps closed (See Figure 7-7 and 7-8). After latching locking hasp, it is recommended to lock it when in transit, for safety and security reasons. This can be done by inserting your key into the tumbler on the cargo vise catch, and turn the tumbler one quarter turn until it stops, then remove key, to unlock reverse procedure. Always check the bar lock handle is properly locked into the locking hasp, before towing.



*Figure 7 - 7: Rotate Handle and Latch in Locking Hasp*



*Figure 7 - 8: Claw and Keeper Fully Engaged*

## **7.7 - VENDING, CAR ESCAPE, & ACCESSORY DOORS**

A vending or accessory door that opens vertically and has a hinge along its top edge. These heavy doors are equipped with assisted lifting, usually with a device known as a “gas spring.”



The gas spring lifting device is not designed to hold a vending door up. You must use the provided solid “prop rods” to hold a vending door in the open position.

**⚠ WARNING**

**Gas springs lose their lifting capability with age and cold weather; and can cause the door to fall, resulting in injury.**

**Always hold the door open until the prop rods are in place.**

**Always use prop rods to hold vending or accessory doors open.**

**Be prepared to hold the weight of the door when removing prop rods.**

**7.8 - ELECTRIC TONGUE JACK**

The tongue jack on your trailer may be powered with an electric motor. The jack is operated up or down using controls located on the jack.

If the motor does not operate, such as when the battery is fully discharged, most electric jacks can be operated manually with a socket wrench or a tool provided for such purpose by the jack manufacturer. For more information please refer to the jack manufacturer’s instructions.

**7.9 - HYDRAULIC JACK(S)**

The landing gear on your trailer may be powered with an electric motor that runs a hydraulic pump. The landing gear is operated up or down using controls located near the landing gear (See Figures 7-9 and 7-10).

If the motor does not operate, such as when the battery is fully discharged, most hydraulic pumps can be operated manually by using a hex key provided with the jack paperwork. Refer to the instructions provided by the landing gear manufacturer that were included with your trailer.



*Figure 7 - 9: Hydraulic Jack*



*Figure 7 - 10: Hydraulic Jack Control Box*

If your trailer is equipped with a dual leg hydraulic jack system there is still only one control box and one pump unit mounted to one jack. The second leg of the dual leg system is referred to as a slave leg. It is completely normal, when beginning to raise the trailer, for one leg to go down to contact the ground independently of the other leg. Once one leg contacts the ground the other leg will then go down and contact the ground. At this point the jacks will begin to lift

the front of the trailer. This system is used to allow for the jacks to raise the trailer evenly without twisting the trailer structure due to independent controls for each leg of the dual leg system. Never continue to raise the trailer once one of the legs reaches its maximum extension, failure to stop at this point could cause damage or binding of the jack legs and could cause damage to the trailer.

## **7.10 - WINDOWS**

When operating sliding window, unlock the sliding portion (see Figure 7-11) in the center of the window and slide the moveable section to the opposite side. To close the window, reverse the above procedure, keeping hands and fingers clear.



*Figure 7 - 11: Slider Window*

One or more windows installed in the living quarters area are egress style windows that can be opened and used as an exit in an emergency. In an emergency situation, Pull on the red tab on the screen (A) to remove the screen from the window and then push in slightly on red handle (B) and pull the red handle up about 1/2", Then pull red handle toward you then push window outward (see Figure 7-12 and 7-13).



Figure 7 - 12: Egress Window in Living Quarters

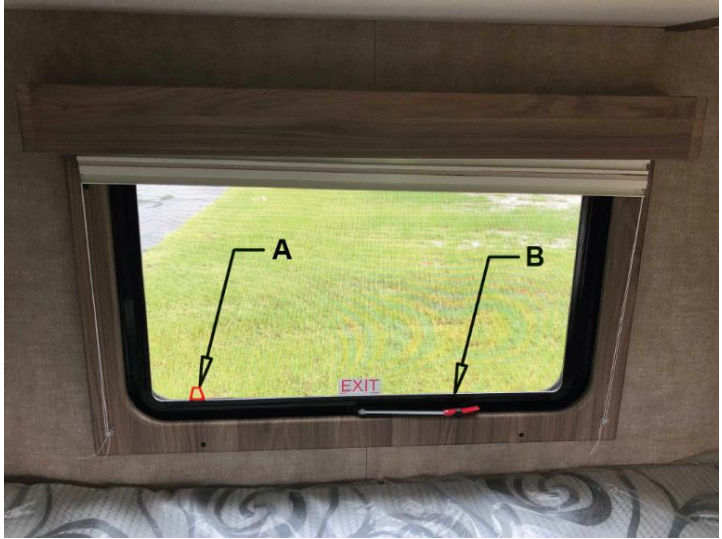


Figure 7 - 13: Egress Window Release Handle

## NOTICE

**Windows include rubber seals and/or drainage weep holes as provisions for water management but are not waterproof, Shadow Trailers cannot guarantee windows not to leak.**

**Inspect/repair seals and keep weep holes at the bottom of the windows clear of debris.**

### **7.11 - DROP FEED WINDOWS**

Many Shadow horse and livestock trailers are equipped with drop feed windows as standard equipment on some models or as optional upgrade on other models. These windows feature a safety bar grill to provide safety for the animals and the best possible ventilation when transporting in higher temperatures. Do not attach or tie anything (animals, feed bags, etc.) to these safety bar grills as it can damage the safety bar grill.

To open the drop feed window, pull down or out (depending on window brand) on the latch handle(s) (see Figure 7-14). Maintain contact with the drop feed window and slowly hinge the drop feed window down and lock it into the window holdbacks on the side of the trailer. The safety bar grill will unlatch and hinge open separately to allow for feeding or some additional freedom for the animal while safely parked. To unlatch the safety bar grill there are one or two sliding upright bars, depending on the width of the drop feed, that you can slide down to release to grill (see Figure 7-15). Do not leave the safety bar grill open while in transit or anytime there is traffic or other potential hazards that could cause injury or death to the animal should an animal's head be through the drop feed window opening.



*Figure 7 - 14: Drop Feed Window*



*Figure 7 - 15: Safety Bar Grill Latch Release*

 **WARNING**

**Do not leave the safety bar grill open while in transit or when parked near traffic or any other potential hazards to horses or animals.**

**Serious injury or death may result.**

To close the safety bar grill, swing the grill back up into the opening making sure the latch plunger(s) are properly seated behind the striker. Maintain contact with the grill until the grill is securely latched in its upright position. To close the drop feed window, swing the window back up into the opening making sure the window is securely latched. Maintain contact with the window until the window is securely latched in its closed and upright position.

 **CAUTION**

**Risk of head injury.**

**Stay clear of drop feed window or safety bar grill when opening or closing. Maintain contact with window or safety bar grill when opening or closing. After closing drop feed window and safety bar grill, verify each are securely latched.**

**NOTICE**

**Windows include rubber seals and/or drainage weep holes as provisions for water management but are not waterproof, Shadow Trailers cannot guarantee windows not to leak.**

**Inspect/repair seals and keep weep holes at the bottom of the windows clear of debris.**

## **7.12 - SLANT LOAD STALL DIVIDERS**

### **⚠ WARNING**

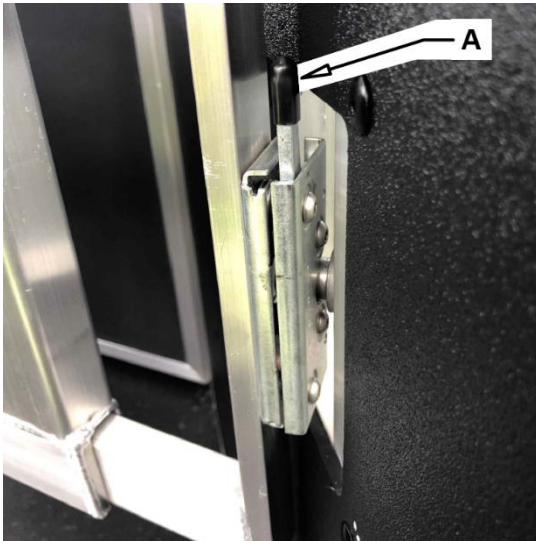
**Do not attempt to release or open a stall divider with an animal applying pressure on the divider.**

**Serious injury or death may result from the divider swinging open with additional force applied.**

**Before unlatching a stall divider:**

- **Be certain the animal is not applying pressure on the divider;**
- **Stand in a safe position, while maintaining control of the divider when unlatching;**
- **Keep hands and fingers clear of pinch points during opening and closing dividers.**

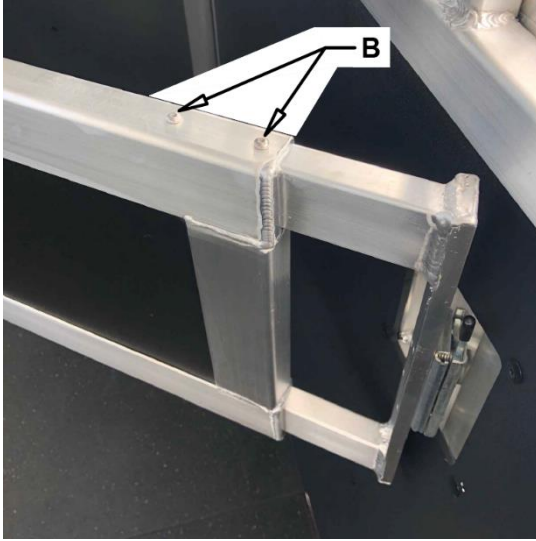
To open divider, (with no animal pressure on divider) place one hand on the divider, take the free hand and push on the latch release lever (A), releasing the latch and freeing the spring-loaded divider to swing open. For divider latching or closing, simply push the divider closed, the latch will engage when fully closed (two clicks similar to a car or truck door latch) (See Figure 7-16).



*Figure 7 - 16: Slant Load Divider Latch Release Lever*



The end of the fixed length dividers have an adjustable end in the event the divider no longer latches smoothly. Remove the screws (B), top and bottom, and adjust end of divider in or out as necessary to keep divider properly contacting the striker bolt in the wall. Reinstall screws top and bottom (See Figure 7-17).



*Figure 7 - 17: Divider Length Adjustment*

The divider also has an adjustable top hinge in the event the divider latch is too high or too low when contacting the striker bolt in the wall. Loosen the Jam Nut, adjust height of the end of the divider as necessary and retighten hardware (See Figure 7-18).



Figure 7 - 18: Divider Latch Height Adjustment (Adjustable Top Hinge)

### **7.13 - STRAIGHT LOAD STALL DIVIDERS**

#### **⚠ WARNING**

**Do not attempt to release or open a breast bar or butt bar with an animal applying pressure on the bar.**

**Serious injury or death may result from the bar swinging open with additional force applied.**

**Before unlatching a breast bar or butt bar:**

- **Be certain the animal is not applying pressure on the bar;**
- **Stand in a safe position, while maintaining control of the bar when releasing;**
- **Keep hands and fingers clear of pinch points during opening and closing breast bars or butt bars.**

Straight load dividers consist of stall divider, head divider, center pole, and breast and butt bars (See Figure 7-19).



*Figure 7 - 19: Straight Load Divider Setup*

The stall divider and head divider are both attached to the center pole with hinges. The opposite end of the head divider pins in place to the ceiling with a spring pin (See Figure 7-20).



*Figure 7 - 20: Head Divider Spring Pin to Ceiling*

The opposite end of the stall divider is held in place mainly by the butt bars but also has a drop leg that rests on the floor (mats) and helps support that end of

the divider. Each breast and butt bar are attached at one end with a D shaped ring and to the other end with either a z-block and shoulder bolt or a pin latch (depending on model) (See Figures 7-21 and 7-22).



*Figure 7 - 21: Breast or Butt Bar with Pin*



*Figure 7 - 22: Breast or Butt Bar with Z-Block*

## **7.14 - DOORS, GATES, AND RAMPS**

Shadow Trailers can be equipped with various styles of doors, gates and ramps. The following subsections describes the operation of each.

### **7.14.1 - LIVESTOCK CUT GATE**

Livestock center cut gates are normally equipped with a “paddle latch”. The gate is equipped with an outside release handle. Do not open center gates from the inside of the trailer with live animal(s) in trailer.

#### **⚠ WARNING**

**Animals are capable of inflicting serious injury or death to a human handler.**

**Do not open the center cut gate from the inside of the trailer with live animals in trailer.**

To open, or pull on the exterior handle (See Figure 7-23). If opening from the inside, you can swing the gate open to the curb side and engage the post and socket hold-back against side wall.



*Figure 7 - 23: Cut Gate Paddle Latch Release Handle*

To close, simply swing the gate back to the closed position engaging the paddle latch. Verify that the gate is securely latched closed before travel.

## 7.14.2 - REAR RAMP OVER REAR DOORS

Your trailer may be equipped with a rear loading ramp over the rear doors (See Figure 7-24). Stand clear of the ramp when opening or closing as it can be heavy. The ramp has torsion springs at the hinges to assist in opening and closing.



*Figure 7 - 24: Load Ramp over 50/50 Doors*

To open, pull up on the spring pin handle. Once the spring pin is fully retracted, turn the handle to latch the spring pin in the retracted position (See Figure 7-25). Stand clear of the ramp when opening or closing. Carefully lower the ramp (See Figure 7-26). Reverse this procedure to return the ramp to its travel/upright position and securely latch the ramp.



*Figure 7 - 25: Pulling Load Ramp Spring Pin*



*Figure 7 - 26: Load Ramp Lowered into Position*



**⚠ WARNING**

**Ramps and ramp doors, though spring assisted to reduce operator effort, can be heavy. In the event of a spring failure the ramp could suddenly fall with serious force. Stand clear of ramp or ramp door when opening and closing. Failure to comply can lead to serious injury or death.**

**7.14.3 - FULL HEIGHT SIDE RAMP DOOR**

Your trailer may be equipped with a full height side ramp door (See Figure 7-27). The ramp door is spring loaded to assist in opening and closing. Open compression latches and carefully pull ramp door to open. Stand clear of the ramp when opening or closing as it can be heavy. Reverse this procedure to return the ramp to its travel/upright & closed position and securely latch the ramp.



*Figure 7 - 27: Full Height Side Ramp*

**⚠ WARNING**

**Ramps and ramp doors, though spring assisted to reduce operator effort, can be heavy. In the event of a spring failure the ramp could suddenly fall with serious force. Stand clear of ramp or ramp door when opening and closing. Failure to comply can lead to serious injury or death.**



#### 7.14.4 - REAR RAMP AND DUTCH DOORS

Your trailer may be equipped with rear ramp and dutch doors (See figure 7-28). Open the top doors first, latch them to their respective hold-backs, then release the ramp bar lock and pull the ramp to open. The ramp is spring loaded to assist in opening and closing. Stand clear of the ramp when opening or closing as it can be heavy. Reverse this procedure to return the ramp to its travel/upright & closed position and securely latch the ramp, then close and latch the dutch doors.



Figure 7 - 28: Rear Ramp and Dutch Doors

#### **⚠ WARNING**

**Ramps and ramp doors, though spring assisted to reduce operator effort, can be heavy. In the event of a spring failure the ramp could suddenly fall with serious force. Stand clear of ramp or ramp door when opening and closing. Failure to comply can lead to serious injury or death.**

#### 7.14.5 - FULL HEIGHT REAR RAMP DOOR

If your trailer is a cargo trailer you may have a full height rear ramp door (See Figure 7-29). To open, release the compression latch handles from the locking hasps while maintaining at least one hand in contact with the ramp to keep it from opening prematurely. Carefully pull out on one of the grab handles and carefully lower the ramp to the ground. Stand clear of the ramp when opening or closing as it can be heavy. Reverse this procedure to return the ramp to its travel/upright & closed position and securely latch the ramp.



Figure 7 - 29: Full Height Rear Ramp Door

**⚠ WARNING**

**A spring and cable counterbalance can inflict serious injury if it breaks, or if incorrectly adjusted. Stand clear when opening the ramp door.**

**Inspect the cable and cable ends each time the ramp door is operated.**

**DO NOT attempt to service the counterbalance. Take the trailer to your Shadow Trailer dealer or trailer service facility for service.**

**⚠ WARNING**

**Ramps and ramp doors, though spring assisted to reduce operator effort, can be heavy. In the event of a spring failure the ramp could suddenly fall with serious force. Stand clear of ramp or ramp door when opening and closing. Failure to comply can lead to serious injury or death.**

#### **7.14.6 - ESCAPE AND WALK THRU DOORS**

Your trailer may have an escape door (see Figure 7-30) normally located at the head of the first stall in slant load trailers and in a box stall on straight load trailers. In some straight load trailers, there may be a door or doors at the head area that are referred to as “walk-thru” doors (see Figure 7-31). An escape will have a bar lock to securely latch the door as animals can come in direct contact with these doors. Escape doors and walk-thru doors are designed for human handlers to escape from the animal area during loading, not for loading and/or unloading the animals. “Walk-thru” doors will have a recessed travel trailer style door latch with deadbolt just like a dress room entry door. As with all doors, be sure, if equipped, these doors are securely latched, and locked (deadbolted if recessed travel trailer latch with deadbolt) before travel.



*Figure 7 - 30: Escape Door*



*Figure 7 - 31: Walk-Thru Door*

## **7.15 - SMALL ANIMAL PENS**

To open small animal pen(s) gates spring loaded latch, pull back on pin's handle then rotate it 90° to the restrain the pin in the open position (see Figure 7-32). When latching reverse procedure being sure pin is full engaged into catch (see Figure 7-33). Post and socket style holdbacks are in place on the outer walls to keep the gates open during loading or unloading.



*Figure 7 - 32: Small Animal Pen Gate Pin (Open Position)*



*Figure 7 - 33: Small Animal Pen Gate Pin (Latched Position)*

## **7.16 - REMOVABLE CENTER POST**

Your trailer may be equipped with one or more removable center posts. This is most common on straight load horse trailers and small animal pen trailers. To remove, you must first remove all attachments from the center post (dividers, head dividers, gates, pen panels, etc.). Next, remove the pin at the top of the

post that is through the ceiling plate and the top of the post by removing the retaining ring at the end of the pin and then slide the pin out while maintaining control of the center post. With the pin at the top removed, you can now lean the post to bring the top out of the ceiling plate and carefully pull the post up out of the slot in the floor. To replace, first with the post leaned back put the flat bar at the bottom into the slot in the floor. Then carefully lean the post into its upright position and into the ceiling plate, replace pin at the top and the retaining ring on the end of the pin.

### **7.17 - SWING-OUT SADDLE RACK**

Many 6'9" wide and 8'0" slant load horse trailers may be equipped with a 3 or 4 rack capable swing-out saddle rack in the rear tack (see Figure 7-34). The swing-out saddle rack latches to the inside of the trailer side wall with a rotary latch and should always be securely latched in transit.



*Figure 7 - 34: Swing-Out Saddle Rack*

To unlatch the saddle rack in order to swing the saddle rack out push up on the release lever on the side of the rotary latch (see Figure 7-35). The swing-out saddle rack will then pivot on the hinges allowing the saddle rack and saddles to be more easily accessed while standing outside the trailer. Once the swing-out saddle rack is fully rotated out (approximately 90° from the latched position), engage the hold-back to hold the swing-out saddle rack in the "out" position (see Figure 7-36).



*Figure 7 - 35: Swing-Out Saddle Rack Latch Release Lever*



*Figure 7 - 36: Swing-Out Saddle Rack Hold-Back*

To return the swing-out saddle rack to its latched position for travel, simply unlatch the hold-back and swing the saddle rack back into the trailer. Then lightly push the saddle rack toward the outside wall to engage the latch. You should hear two clicks (similar to a car or truck door latch) to fully engage the latch.

If your trailer is equipped with a swing-out saddle rack and also is equipped with front tack / dress room area there is often what is called a T-Bar for a secondary/storage location to relocate the swing-out saddle rack from the rear tack area. Do relocate the swing-out saddle rack to the T-Bar, first remove all saddles and/or tack from the saddle seats. Then remove and stow the saddle seats by simply lifting each one up and out of the C shaped channels that hold the saddle seats. Then remove and store the retaining rings on the bottom of the two hinge pins. Then unlatch the swing-out saddle rack from the wall and partially swing the saddle rack out of the trailer. Lift the swing-out saddle rack up pulling the hinge pins out of the hinge blocks that are welded to the trailer wall. Place the swing-out saddle rack onto the T-Bar by lining up the hinge pins to the holes in top side of the hinge blocks on the T-Bar and setting it down allowing the hinge pins to drop into the T-Bar hinge blocks. Then swing the swing-out saddle rack and lightly push to latch it to the T-Bar. Replace the retaining rings on the bottom of the two hinge pins. Replace the saddle seats onto swing-out saddle rack.

## **7.18 - TACK ROOM / COMPARTMENT**

It is very common on most horse trailers to have a tack compartment either in the front of the trailer separate from the horse area, in the rear of the trailer, or both. Only use these tack areas as short term storage while in transit due to condensation, mildew, and lack of climate control.

### **7.18.1 - FRONT TACK ROOM / DRESS ROOM**

Located in front of the horse area with generally one access door from the outside on the curbside or streetside (depending on model). Front tack rooms are designed to store tack short term and must not be used for camping or overnight stay.

Only trailers equipped with a finished living quarters are designed to accommodate camping, sleeping and/or overnight stays, and are equipped with safety features such as, a vent and/or egress window (escape hatch). Walk-in tack rooms and unfinished living quarters are not equipped with these features.

### **DANGER**

**You can die or be brain damaged by Carbon Monoxide.**

**Do not operate a generator, portable grills, portable heaters, portable lanterns, or portable stoves inside the trailer.**



## **WARNING**

**Do not sleep in a trailer not equipped with living quarters.**

**A trailer not designed with living quarters should only be used for transportation of its intended cargo.**

### **7.18.2 - COLLAPSIBLE REAR TACK COMPARTMENT**

Your trailer may be equipped with a collapsible rear tack compartment that provides great use of space to store saddles and tack while in transit. A collapsible rear tack compartment is typically in the rear of a slant load trailer and accessed by opening the streetside (driver's side) rear door. With all contents and saddle racks removed from the compartment, the wall can be folded up against the outer wall. First remove all tack and contents from the compartment. Next remove the saddle racks from their seat on the wall, remove the swing-out saddle rack, or remove the saddle rack post (depending on model and size of rear tack compartment). Properly relocate or stow the removed items. Locate the spring-loaded pins at the top and bottom of the rearward part of the tack wall and retract and restrain the pins in the open position. Fold the tack wall together and then swing the folded wall against the outer wall. Restrain the folded tack wall against the outer wall using the d-rings and double ended snap hook. To revert the tack compartment back to its usable state reverse the procedure and ensure that all pins are fully seated and that everything is secure for travel.

### **7.19 - SWINGING SLANT WALL**

A very well-liked feature of many of the stablemate slant load models is a swinging slant wall. The swinging slant wall separates the front tack area from the horse area. The swinging slant wall can be unlatched and opened to open up the entire inside of the trailer and to gain floor space. To unlatch pull the pin with the red handle and turn it 90° to restrain the pin in the open position (see Figure 7-37). There is a set of small d-rings and a double end snap hook as a hold-back to latch the swinging slant wall in the open position (see Figure 7-38). When the swinging slant wall is opened up you must still follow all of the loading and weight distribution procedures and guidelines and be sure not to misload or overload the trailer.



*Figure 7 - 37: Swinging Slant Wall Latch Pin*



*Figure 7 - 38: Swinging Slant Wall Hold-Back Snap Hook*

## **8 - INSPECTION, SERVICE, & MAINTENANCE**

### **8.1 - INSPECTION, SERVICE, & MAINTENANCE SUMMARY CHARTS**

You must inspect, maintain and service your trailer regularly to ensure safe and reliable operation. If you cannot or are unsure how to perform the items listed here, have your dealer and capable trailer service shop perform them. Note: In addition to this manual, also always check the applicable component manufacturer's manual(s).

<b><u>SUGGESTED INSPECTION AND MAINTENANCE INTERVALS</u></b>		
(MINIMUM - BASED ON AVERAGE TRAILER USE)		
<b>ITEM</b>	<b>SERVICE/ACTION REQUIRED</b>	<b>MANUAL REFERENCE SECTION</b>
<b><u>BEFORE EACH USE</u></b>		
Breakaway Brakes	Check operation.	3.2.1.5, 3.2.2.5, 8.2.5.4, 8.2.5.5
Breakaway Battery	Fully charged & connections clean and secure	8.2.5.4
Breakaway Switch	Check operation.	3.2.1.5, 3.2.2.5, 8.2.5.4, 8.2.5.5
Brakes, all types	Check operation.	8.2.5, Brakes/Axle Manufacturer
Hub Oil Level	Check oil level in hubs, if equipped.	8.2.13.2, Brakes/Axle Manufacturer
Coupler and Hitch Ball	Check for cracks, pits, flat spots, deformation. Grease. Check locking mechanism.	3.2.1.1, 8.2.6.1

Gooseneck Coupler and Hitch Ball	Check for cracks, pits, flat spots, deformation. Grease. Check locking mechanism.	3.2.2.1, 8.2.6.2
Lights and Signals	Check operation. Verify electrical connection is clean, fully seated, and secure.	3.2.1.6, 3.2.2.6, 8.2.8
Tire Pressure	Check for proper inflation pressure.	8.2.11, 9.5.4
Lug Nuts (Bolts)	Check torque.	8.2.14
<b><u>MONTHLY</u></b>		
Floor and Mats	Remove all mats, wash both sides and let dry. Wash floor and let dry.	8.2.2.1
Roof and Roof Sealants	Clean and inspect roof skin, and all sealants for holes, loss of adhesion, cracks, cuts, or damage.	8.2.2.4
Sealants	Inspects caulking and sealants for holes, loss of adhesion, cracks, cuts, or damage.	8.2.2.4
<b><u>3 MONTHS OR 3,000 MILES</u></b>		
Brake Shoes	Adjust if required.	Brakes/Axle Manufacturer
Hinges, Doors, Dividers, and Gates	Inspect for damaged, worn, or broken parts. Replace as necessary.	
Drop Feed Window Latches	Clean and lubricate latch mechanism.	8.2.10
Door Latches	Clean and lubricate latch mechanism.	

Tires	Inspect treads & sidewalls thoroughly. Replace tire when treads are worn or sidewall bulge. Rotate tires.	8.2.11
Hyd. Brakes Master Cylinder	Check fluid level and replenish. Check for leaks and sticking.	8.2.5.5
<b><u>6 MONTHS OR 6,000 MILES</u></b>		
Axle Attachment Bolts	Check by Shadow Dealer or Trailer Service Center.	8.2.1
Roof Vents	Clean dirt buildup and lubricate hinges.	
Windows	Clean dirt buildup and lubricate hinges and window slides.	
<b><u>12 MONTHS OR 12,000 MILES</u></b>		
Jack, Drop Leg	Grease gears at the top.	8.2.7
Hyd. Brakes Master Cylinder	Check for cracks, leaks, kinks.	8.2.5.5
Hyd. Brakes Lines	Verify operation/inspect.	
<b><u>12 MONTHS OR 36,000 MILES</u></b>		
Electric Brake Magnets	Inspect for wear and current draw.	Brakes/Axle Manufacturer
Electric Brake Controller (in tow vehicle)	Check for correct amperage and modulation.	Brakes/Axle Manufacturer
Brake Shoes and Pads	Inspect for wear or contamination.	Brakes/Axle Manufacturer
Hub/Drum or Rotors	Inspect for abnormal wear or scoring.	Brakes/Axle Manufacturer

Wheel Bearings.	Inspect for corrosion or wear. Clean. Repack (if grease bearing).	Brakes/Axle Manufacturer
Seals	Inspect for leakage. Replace if removed.	Brakes/Axle Manufacturer
Springs	Inspect for wear, loss of arch.	Brakes/Axle Manufacturer
Suspension Parts	Inspect for bending, loose fasteners, wear.	Brakes/Axle Manufacturer
U-bolts	Tighten to specified torque values.	Brakes/Axle Manufacturer

## **8.2 - INSPECTION AND SERVICE INSTRUCTIONS**

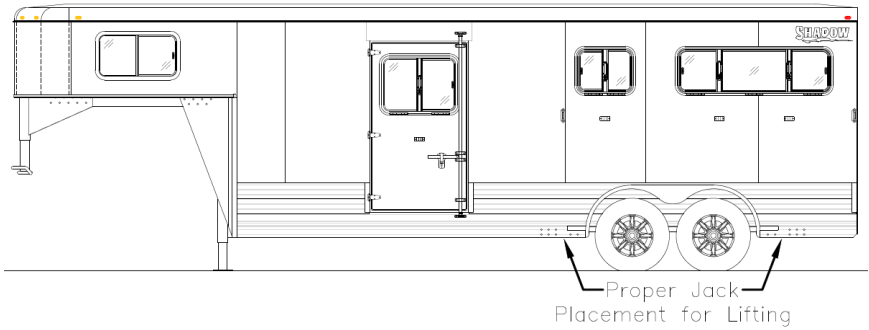
### **8.2.1 - AXLE BOLTS, FRAME, SUSPENSION, & STRUCTURE**

#### **WARNING**

**Worn or broken suspension parts can cause loss of control and may result in serious injury or death.**

**Have trailer professionally inspected annually and after any impact.**

To perform many of the inspection and maintenance activities, you must jack up the trailer. Figure 8-1 indicates the general areas where jacks and jack stands may be applied.



*Figure 8 - 1: Proper Lifting Points*

When jacking and using jack stands, place them so as to clear wiring, brake lines, and suspension parts (springs, torsion bars, etc.). Place jacks and jack stands inside of the perimeter strip on the supporting structure to which the axles are attached.

**⚠ WARNING**

**Never get under your trailer unless it is on solid and level ground and supported on properly placed and secured jack stands.**

**A trailer that is not properly and securely supported may result in trailer falling leading to serious injury or death.**

## **8.2.2 - TRAILER BODY & STRUCTURE**

### **8.2.2.1 - CLEANING**

Wash the entire trailer thoroughly immediately after exposure to road salt and/or liquid deicer. The salt and/or liquid deicer will corrode and pit the aluminum.

Because the trailer floor receives the most abuse, it will most likely corrode before any other part of the structure. This is particularly true for horse and livestock trailers, having floors subjected to urine and manure. The urine and manure are corrosive to the aluminum flooring and other structural parts of the trailer.

Remove the rubber mats from the floor of the trailer, and wash them, at least every month. Using a power washer and a neutral ph automotive detergent solution, wash both sides of the rubber mat, as well as the floor and interior walls of the trailer. Rinse the rubber mat and the trailer floor and walls completely. Rinse extremely well, it is very important to expel all acid residues, in order to provide maximum protection to the aluminum floor. Be sure the rubber mat and

trailer floor are completely dry before replacing the rubber floor mats. HINT: Before replacing rubber mats sprinkle a box of baking soda over the dry floor. The baking soda will help to neutralize the corrosive acids in the urine and manure. It will also help control odors.

Washing the exterior of your trailer regularly is the easiest way to maintain its new appearance. It is recommended to wash the exterior at least every three months, with cool or lukewarm water and a neutral pH automotive detergent solution. Numerous cleaning products are available from your local automotive supply store.

Never use strong house hold detergents or soap, such as dish washing or laundry liquid. These products can discolor and spot the painted and natural aluminum surfaces of your trailer. Hint: DO NOT USE "Dawn®" brand dish washing detergent, it can cause permanent tea-colored stains on natural aluminum surfaces.

Never wash a trailer that is "hot to the touch" or during exposure to strong, direct sunlight. Always use a clean sponge, carwash mitt, or truck type soft brush and pole with plenty of water for best results. Dry the trailer with a chamois or soft terry cloth towel in order to eliminate water spotting.

It is especially important to wash the trailer regularly when used during the winter months, as dirt and road salt are difficult to remove and cause damage to the trailer. Immediately remove items such as gasoline, diesel fuel, bird droppings and insect deposits because they can cause permanent damage to the finish over time. Flush the complete underside of your trailer frequently. Keep body and door drain holes free from packed dirt.

If your trailer is equipped with rubber floor or ramp mats, DO NOT USE rubber, plastic and vinyl protective products on the mats, as they cause the mat to become extremely slippery.

As with all metals, natural raw aluminum over time will oxidize and tarnish, changing from an even silver white to a dark gray somewhat streaked appearance. To remove this aluminum oxide from the surface and bring back your trailer's NEW appearance, periodically, your aluminum trailer may need to be acid washed. Acid washing should be done by experienced personnel at your local dealership or truck wash. The time frame between acid washes varies greatly from location to location. Environmental issues such as humidity, chemical exposures, road salts, and temperature can vary the time between acid washes greatly, it all depends on the general appearance of your specific trailer. But as a Rule of Thumb, most aluminum trailers need to be acid washed about every two years.

#### **8.2.2.2 - FASTENERS AND FRAME MEMBERS**

Inspect all of the fasteners and structural frame members for bending and other damage, cracks, or failure. Repair or replace any damaged fastener and repair



the frame member. If you have any questions about the condition or method of repair of fasteners or frame members, get the recommendation of, or have the repair done by, your dealer.

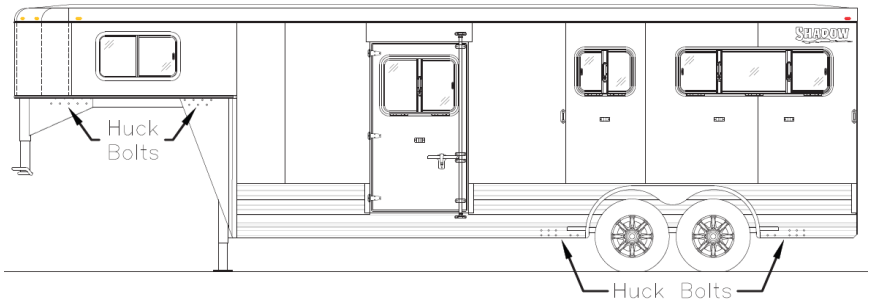
The various fastener types used on your trailer are:

- Bolts, which are used mainly for attaching interior and exterior tie rings, breast and butt bars, and some other hardware;
- Self-tapping screws, which are used to attach the roof skin found under the seal tape, wood flooring to aluminum cross members, and various other applications.
- Rivets, of various types and sizes, are used to attached the painted aluminum ceiling skin, exterior and/or interior aluminum sheeting in certain areas, trim, hinges, roof skin, and various other areas;
- VHB double sided tape, which may be used in conjunction with adhesive sealant to adhere to exterior and/or interior aluminum sheeting to each other and to the trailer's structure, as well as door and ramp skins; and
- Huck Bolts, which may be at various locations on the sub-frames at the axle area and gooseneck area. Huck bolts require a specialty tool and are not user serviceable. If you detect a loose huck bolt fastener, do not tow the trailer. Call your dealer for instructions.

**▲ WARNING**

**Broken or damaged fasteners or welds can cause damage to the trailer and/or its contents, serious injury, or death.**

**Inspect trailer before each use and repair or replace all damaged parts.**



*Figure 8 - 2: Typical Huck Bolt Locations*

### 8.2.2.3 - WELDS

All welds can crack or fail when subjected to heavy loads, impact, or movement of cargo that was not properly tied to prevent movement. Any time that you know or suspect that the trailer has been subjected to heavy loads, impact, or movement of cargo, immediately inspect the welds and fasteners for damage. To prevent severe damage to your trailer, inspect all of the welds for cracks or failure at least once a year.

#### **WARNING**

**Improper weld repair will lead to early failure of the trailer structure and can cause serious injury or death.**

**Do not repair cracked or broken welds unless you have the skills and equipment to make a proper repair. Have the welds repaired by your Shadow Trailer dealer or a capable repair facility.**

#### **WARNING**

**Broken or damaged fasteners or welds can cause damage to the trailer and/or its contents, serious injury, or death.**

**Inspect trailer before each use and repair or replace all damaged parts.**

### 8.2.2.4 - SEALANTS

There are different sealant materials over a large portion of the trailer. The sealant on the side sheets at seams and where the sheets meet the lower or upper rails and other extrusions and sheets. The roof is sealed with a tape at the intersection seam of the roof coil and the roof rail extrusion. There is caulk applied in specific areas of the completed assembly to ensure against leaks. All sealant materials should be visually inspected at least once a month. Have any sealants repaired or replaced if there are any signs that it is no longer adhered, has deteriorated, or has been damaged. Contact your dealer to purchase appropriate sealant for the application/area.

## NOTICE

Although the roof seams and many places throughout the trailer are sealed, the trailer is not guaranteed to be waterproof.

Precautions should be made to prevent water damage of your cargo. Failure to do so may result in water damage to contents.

Inspect all sealants at least once per year and repair or replace if necessary.

### 8.2.3 - RAMP DOOR SPRING & CABLE ASSIST

If your trailer has a drop-ramp door, the weight of the door may be partially held by a torsion spring and a cable. Stand to the side when opening the drop ramp. You could be hurt if you are behind the drop ramp and the counterbalance does not work.

## WARNING

**A spring and cable counterbalance can inflict serious injury if it breaks, or if incorrectly adjusted. Stand clear when opening the ramp door.**

**Inspect the cable and cable ends each time the ramp door is operated.**

**DO NOT attempt to service the counterbalance. Take the trailer to your Shadow Trailer dealer or trailer service facility for service.**

Inspect the cable and cable ends regularly for fraying and signs of loosening. If released, a torsion spring can inflict serious injury.

**The torsion spring and cable are not user serviceable. The torsion spring must be serviced by a person who is trained in torsion spring safety.**

### 8.2.4 - SLIDE-OUTS

Trailers outfitted with living quarters may include one or several slide-outs. Shadow manual slides have much fewer components than electric slide-out mechanisms. However, no matter if your slide out(s) is a Shadow manual design or an electric slide-out, there is maintenance required to ensure smooth and trouble-free operation.

For manual slide-outs, there are two roller tracks that are located underneath the slide-out box. When the slide-out is pushed out, a portion of these tracks can be accessed from outside the unit by looking at the underside of the slide-out box. Using a white lithium grease, clean then lubricated the entire length of the accessible tracks. When the slide-out is pulled back in the grease applied will transfer to the rollers that the tracks slide in and out on.

For electric slide-out mechanisms refer to the appropriate manufacturer for guidance on proper maintenance of the applicable slide-out mechanism that your trailer is equipped with. If you are unsure what slide-out mechanism your trailer is equipped with and/or who the manufacturer of the slide-out mechanism is, please contact Shadow Trailers at 352-529-2190 for assistance.

## **8.2.5 - TRAILER BRAKES**

### **8.2.5.1 - INITIAL INSPECTION**

#### **⚠ WARNING**

**Brakes that are out of adjustment can result in serious injury or death.**

**Brakes must be adjusted at the intervals specified.**

The brake shoes must be adjusted after the first 200 miles of use, and each 3,000 miles thereafter. Most Lippert axles that Shadow uses are equipped with a forward self-adjusting mechanism that will automatically adjust the brakes shoes as you use your trailer. Read your axle and brake manual to see how to adjust your brakes. If you do not have this manual, call Shadow Trailers at 352-529-2190 for a free copy.

### **8.2.5.2 - PERIODIC INSPECTION**

Properly functioning brake shoes and drums are essential to ensure safety. You must have your dealer inspect these components at least once per year, or each 36,000 miles (whichever comes first).

### **8.2.5.3 - MANUALLY ADJUSTING BRAKES**

Some braking systems are not self-adjusting. Refer to your axle and brake manual to see how to adjust your brakes. If you do not have this manual, call Shadow Trailers at 352-529-2190 for a free copy.

### **8.2.5.4 - BRAKES, ELECTRIC**

Two different types of electric brakes may be present on the trailer: an emergency electric breakaway system, which acts only if the trailer comes loose from the hitch and the breakaway pin is pulled. The other brake is an electric braking system that acts whenever the brakes of the tow vehicle are applied.

## Breakaway Brake

- Breakaway Battery

This battery supplies the power to operate the trailer brakes if the trailer uncouples from the tow vehicle. Be sure to check, maintain and replace the battery according to the battery manufacturer's instructions. The breakaway battery is equipped with an inline battery charger, in order for this charger to function, the trailer must receive 12-volt auxiliary power from the tow vehicle.

- Breakaway Switch

This switch causes the breakaway battery to operate the electric brakes if the trailer uncouples from the tow vehicle.

To check for proper functioning of the switch, battery and brakes, you must pull the pin from the switch and confirm that the brakes apply to each wheel. You can do this by trying to pull the trailer with the tow vehicle, after pulling the pin. The trailer brakes may not lock, but you will notice that a greater force is needed to pull the trailer.

### **WARNING**

**If electric breakaway brakes do not operate when the trailer is uncoupled from the tow vehicle, serious injury or death can occur.**

**Check emergency breakaway brake system BEFORE each tow.**

## Tow Vehicle Operated Electric Brakes

The electric brakes that operate in conjunction with the tow vehicle brakes must be "synchronized" so that braking is properly distributed to the tow vehicle brakes and the trailer brakes. For proper operation and synchronization, read and follow the axle/brake and the brake controller manufacturers' instructions.

## Magnets for all Electric Brakes

To make certain an electrically-operated braking system will function properly, you must have your dealer inspect the magnets at least once a year, or each 36,000 miles (whichever comes first). See the brake manual for wear and current inspection instructions.

## 8.2.5.5 - BRAKES, HYDRAULIC

If your trailer has hydraulically-operated brakes, they function the same way the hydraulic brakes do on your tow vehicle. The hydraulic braking system must be inspected by a dealer, as often as the brakes on the tow vehicle, but no less than once per year, or each 12,000 miles (whichever comes first). This inspection

includes an assessment of the condition and proper operation of the wheel cylinders, brake shoes, brake drums and hubs.

You must check the fluid level in the master cylinder reservoir at least every three months. If you tow your trailer an average of 1,000 miles per month in a hot and dry environment, you must check the brake fluid level once a month. The brake fluid reservoir is located on the tongue of the trailer or near the gooseneck. Fill with DOT 3 brake fluid.

### **Electric-Operated Hydraulic**

Electric/hydraulic braking systems, which are mounted on the trailer, use a small electrically-driven pump to generate hydraulic pressure, which operates the brake cylinders. Like electrical brakes, an electric/hydraulic braking system is operated by an electrical signal from the tow vehicle.

### **Breakaway Brake**

- **Breakaway Battery**

This battery supplies the power to operate the trailer brakes if the trailer uncouples from the tow vehicle. Be sure to check, maintain and replace the battery according to the battery manufacturer's instructions. The breakaway battery is equipped with an inline battery charger, in order for this charger to function, the trailer must receive 12-volt auxiliary power from the tow vehicle.

- **Breakaway Switch**

This switch causes the breakaway battery to operate the electric brakes if the trailer uncouples from the tow vehicle.

To check for proper functioning of the switch, battery and brakes, you must pull the pin from the switch and confirm that the brakes apply to each wheel. You can do this by trying to pull the trailer with the tow vehicle, after pulling the pin. The trailer brakes may not lock, but you will notice that a greater force is needed to pull the trailer.

## **WARNING**

**If electric breakaway brakes do not operate when the trailer is uncoupled from the tow vehicle, serious injury or death can occur.**

**Check emergency breakaway brake system BEFORE each tow.**

## **8.2.6 - TRAILER CONNECTION TO TOW VEHICLE**

### **8.2.6.1 - COUPLER AND BALL**

The coupler on the trailer connects to the ball attached to the hitch on the tow vehicle. The coupler, ball and hitch transfer the towing forces between the tow vehicle and the trailer. Before each tow, coat the ball with a thin layer of automotive bearing grease to reduce wear and ensure proper operation; and check the locking device that secures the coupler to the ball for proper operation.

If you see or feel evidence of wear, such as flat spots, deformations, pitting or corrosion, on the ball or coupler, immediately have your dealer inspect them to determine the proper action to prevent possible failure of the ball and coupler system. All bent or broken coupler parts must be replaced before towing the trailer.

The coupler handle lever must be able to rotate freely and automatically snap into the latched position. Oil the pivot points, sliding surfaces, and spring ends with SAE 30W motor oil. Keep the ball pocket and latch mechanism clean. Dirt or contamination can prevent proper operation of the latching mechanism.

When replacing a ball, the load rating must match or exceed the GVWR of the trailer.

### **8.2.6.2 - GOOSENECK**

The gooseneck receiver on the trailer connects to a hitch-mounted ball on the towing vehicle. The receiver, ball and hitch transfer the towing forces between the tow vehicle and the trailer. Before each tow, coat the ball with a thin layer of automotive bearing grease to reduce wear and ensure proper operation; and check the locking device that secures the receiver to the ball for proper operation.

The coupler handle lever must be able to rotate freely and automatically snap into the latched position. Oil the pivot points, sliding surfaces, and spring ends with SAE 30W motor oil or if a grease zerk is present use a grease gun to grease the latching mechanism. Keep the ball pocket and latch mechanism clean. Dirt or contamination can prevent proper operation of the latching mechanism.

If you see or can feel evidence of wear, such as flat spots, pitting or corrosion, on the ball or receiver, immediately have your dealer inspect them to determine the proper action to prevent possible failure of the ball and receiver system.

When replacing a ball, the load rating must match or exceed the GVWR of the trailer.

### **8.2.7 - LANDING LEG OR JACK**

If a grease zerk fitting is present, you must use a grease gun to lubricate the jack mechanism. Grease the gears in the top of hand-cranked jacks once a year, by removing the top of the jack and pumping or hand packing grease into the gears.

### **8.2.8 - LIGHTS AND SIGNALS**

Before each tow, check the trailer taillights, stoplights, turn signals and any clearance lights for proper operation.

#### **WARNING**

**Improper operating or inoperable taillights, stoplights, and turn signals can cause collisions.**

**Before towing trailer verify all lights are working properly.**

**Repair or replace before towing the trailer.**

### **8.2.9 - ACCESSORY BATTERY**

Your trailer may be outfitted with an accessory battery that operates lighting, electric landing gear, slide-outs or other accessories. An accessory battery may be kept charged either by the tow vehicle, by the generator or shore power, if so equipped, or by automotive type 12V battery charger or battery tender. See the manual for the accessory battery.

A disconnect switch may be provided to disconnect the accessory battery when you do not plan to be using the trailer for an extended period, such as seasonal storage. If there is no disconnect switch, then remove the cables from the battery terminals.

The accessory battery must be kept in a charged condition during storage. The battery could freeze and break if it becomes discharged.

### **8.2.10 - DROP FEED WINDOW LATCHES (HORSE TRAILERS)**

Clean and lubricate the latch (see Figure 8-1) at the end of the season, before first use after storage and at least every three months during use. Lubricate the latch (1) with a spray lubricant containing Teflon® or white lithium grease.





*Figure 8 - 3: Drop Feed Window Latch Catch*

Inspect latches and striker plates for wear and alignment. Have your dealer adjust or replace latches and striker plates as necessary to ensure the feed doors close and fit securely.

### **8.2.1 1 - TIRES**

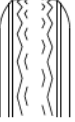
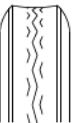
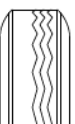



Before each tow, be sure the tire pressure is at the value indicated on the Certification / VIN label. Tire pressure must be checked while the tire is cold. Do not check the tire pressure immediately after towing the trailer. Allow at least three hours for a tire to cool, if the trailer has been towed for as much as one mile. Replace the tire before towing the trailer if the tire treads have less than 2/32-inch depth or the telltale bands are visible.

A bubble, cut or bulge in a side wall can result in a tire blowout. Inspect both side walls of each tire for any bubble, cut or bulge; and replace a damaged tire before towing the trailer.

#### **⚠ WARNING**

**Worn, damaged, or improperly-inflated tires can cause loss of control, damage, serious injury, or death.**

**Check tires before each tow.**

<b>Tire Wear Diagnostic Reference Chart</b>		
<b>Wear Pattern</b>	<b>Cause</b>	<b>Corrective Action</b>
 <b>Center Wear</b>	Over Inflation	Adjust pressure to recommended tire pressure.
 <b>Edge Wear</b>	Under Inflation	Adjust pressure to recommended tire pressure.
 <b>Side Wear</b>	Loss of camber or overloading	Make sure load doesn't exceed tire or axle rating. Check axles and camber.
 <b>Toe Wear</b>	Incorrect toe-in	Check/correct axle alignment.
 <b>Cupping</b>	Out-of-balance	Check bearing adjustment and balance tires.
 <b>Flat Spots</b>	Wheel lockup & tire skidding	Avoid sudden stops when possible and adjust brakes and/or brake controller.

### **8.2.12 - WHEELS**

If the trailer has been struck, or impacted, on or near the wheels, or if the trailer has struck a curb, inspect the rims for damage (i.e., being out of round); and replace any damaged wheel. Inspect the wheels for damage every year, even if no obvious impact has occurred.

**Never install aftermarket wheels or lug nuts on your trailer.** Use only original equipment wheels and lugs nuts. Aftermarket wheels and lug nuts may not meet the load carrying requirements, pressure capacity and offset as the original equipment.

### **8.2.13 - WHEEL BEARINGS**

A loose, worn or damaged wheel bearing is the most common cause of brakes that grab and side wear on tires.

To check your bearings, jack trailer and check wheels for side-to-side looseness. If the wheels are loose, or spin with a wobble, the bearings must be serviced or replaced.

Your trailer will be equipped with one of the following types of wheel bearings:

- Standard – Bearings are lubricated by grease or oil.
- SuperLube® or other grease fitting lubricated bearings - Bearings are lubricated by grease and are identified by a grease fitting behind a rubber cap (on the grease cap) on each end of the axle.

#### **8.2.13.1 - STANDARD BEARINGS, GREASE**

Disassemble, inspect and re-pack the wheel bearings every 12 months or 36,000 miles, whichever occurs first.

If a trailer wheel bearing is immersed in water, it must be repacked after each immersion.

If your trailer has not been used for an extended amount of time, have the bearings inspected and packed more frequently, at least every six months and prior to use.

Refer to the axle manufacturer's manual for additional information and for instructions to disassemble and service the wheel bearings.

#### **8.2.13.2 - STANDARD BEARINGS, OIL**

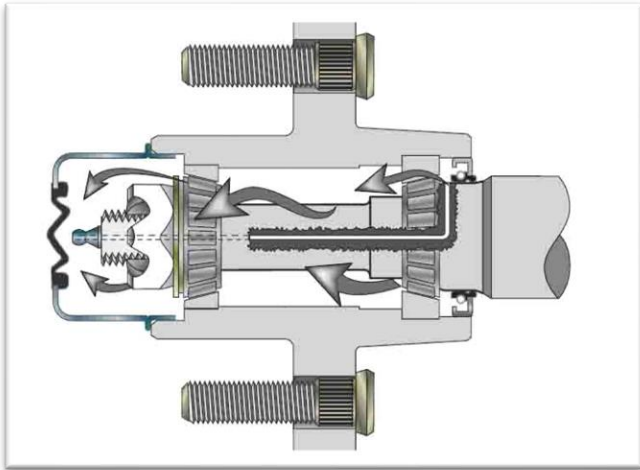
If your trailer is equipped with oil lubricated bearings, check the oil level and add, if necessary, before every use.

Disassemble and inspect the wheel bearings every 12 months or 36,000 miles, whichever occurs first.

Refer to the axle manufacturer's manual for additional information, for oil type and procedure for adding oil, and for instructions to disassemble and service the wheel bearings.

#### **8.2.13.3 - SUPERLUBE® BEARINGS, GREASE**

The bearings must be properly lubricated to ensure safe operation of your trailer (See figure 8-4).



*Figure 8 - 4: SuperLube® Hub Grease Flow*

Disassemble, inspect and re-pack the wheel bearings every 12 months or 36,000 miles, whichever occurs first.

Refer to the axle manufacturer's manual for additional information and instructions to disassemble and service the wheel bearings.

#### **8.2.14 - LUG NUTS (BOLTS)**

Lug nuts are prone to loosen right after a wheel is mounted to a hub. When driving on a remounted wheel, check to see if the lug nuts are tight after the first 10, 25 and 50 miles of driving and before each tow thereafter.

Being sure wheel mounting nuts (lug nuts) on trailer wheels are tight and properly torqued is an important responsibility that trailer owners and users need to be familiar with and practice. Inadequate and/or inappropriate wheel nut torque (tightness) is a major reason that lug nuts loosen in service. Loose lug nuts can rapidly lead to a wheel separation with potentially serious safety consequences.

Be certain you have a clear understanding of the specific wheel maintenance responsibilities your vehicle manufacturer requires/recommends you, as the owner or user, must perform in order to ensure your wheel equipment is safely maintained. Check the lug nut tightness the first 10, 25 and 50 miles of driving after mounting the wheels and before each tow thereafter. If you have any questions about proper tightening practices contact your dealer.

The only way to be certain you have checked the tightness or torqued the lug nuts to the proper value is with a torque wrench. Four-way wrenches, ratchets, and similar tools can be useful for short-term emergency repairs but are not

appropriate tools for accurately checking lug nut torque. You must use a torque wrench to accurately indicate the torque that you are applying to the lug nut.

Keep a record of the date and approximate mileage when you check the lug nut torque. Note any lug nut that has lost torque. Investigate the reason(s) if the lug nut torque is not maintained after more than one retorque application, because this indicates there is something wrong with the lug nuts, studs, wheels and/or hubs and should be corrected.

Contact your dealer or vehicle manufacturer immediately if you experience any persistent lug nut loosening or any other lug, wheel or axle problems.

If you find any loose lug nuts while tightening, remove the wheel(s) and take them to your dealer for inspection. The wheel may be damaged and if so, must be replaced. Lug nuts on a damaged wheel holes will not retain tightness.

In the event of a wheel separation incident, notify the vehicle manufacturer and dealer. Seek prompt professional assistance in assessing the trailer and its gear, and retain, but don't re-use lug nuts, wheels, and studs that were involved in the incident. Don't repair or service the trailer yourself. Contact a trained technician.

 **WARNING**

**Lug nuts are prone to loosen after initial installation, which can lead to serious injury or death.**

**Check lug nuts for tightness on a new trailer, and after re-installing a wheel at 10, 25, and 50 miles and every 50 miles thereafter during the first 200 miles of travel.**

 **WARNING**

**Metal creep between the wheel and the lug nuts (bolts) will cause the wheel to loosen.**

**Serious injury or death can occur if wheel comes off.**

**Tighten lug nuts (bolts) before each tow.**

Tighten the lug nuts to the proper tightness to prevent wheels from coming loose. Refer to the steps that follow and the axle manufacturer's information. Use a calibrated torque wrench to tighten the lug nuts. Over-tightening may result in breaking the studs or permanently deforming the mounting stud holes in the wheels.

Remove all excess paint, oil and grease from mounting surfaces.

Start all lug nuts by hand to prevent cross threading.

Tighten lug nuts in sequence shown in “Lug Nut Sequence of Tightening” (See Figure 8-5) and to the torque found in “Wheel Torque Requirement Chart” (See Table 8-1) corresponding to the stud size and lug nut type.

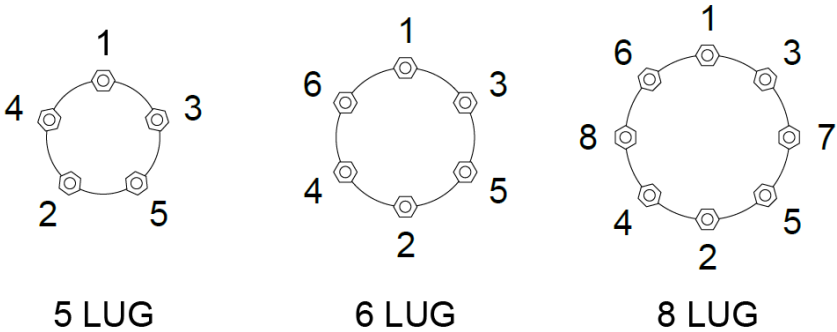


Figure 8 - 5: Lug Nut Sequence of Tightening

Wheel Torque Requirement Chart (Steel Wheels)				
Lug Nut Type	Stud Size	Torque Sequence		
		1st Stage	2nd Stage	3rd Stage
Coned	1/2"	20-25 ft-lbs	50-60 ft-lbs	90-120 ft-lbs
Coned	9/16"	20-25 ft-lbs	60-70 ft-lbs	120-140 ft-lbs
Non-Swivel Flanged	5/8"	50-60 ft-lbs	150-200 ft-lbs	275-325 ft-lbs
Swivel Flanged	5/8"	50-60 ft-lbs	90-100 ft-lbs	150 ft-lbs

Table 8 - 1: Wheel Torque Requirement Chart

**Never install aftermarket wheels or lug nuts on your trailer.** Use only original equipment wheels and lugs nuts. Aftermarket wheels and lug nuts may not meet the load carrying requirements, pressure capacity and offset as the original equipment.

**⚠ WARNING**

**Aftermarket wheels may part from the trailer, resulting in serious injury or death.**

**Never install aftermarket wheels or lug nuts on your trailer.**

**Never install aluminum wheels on hubs/studs that are designed for only steel wheels.**

**⚠ WARNING**

Lug nuts are prone to loosen after initial installation, which can lead to serious injury or death.

Check lug nuts for tightness on a new trailer, and after re-installing a wheel at 10, 25, and 50 miles and every 50 miles thereafter during the first 200 miles of travel.

**⚠ WARNING**

Metal creep between the wheel and the lug nuts (bolts) will cause the wheel to loosen.

Serious injury or death can occur if wheel comes off.

Tighten lug nuts (bolts) before each tow.

## **9 - TIRE SAFETY INFORMATION**

This portion of the User's Manual contains tire safety information as required by 49 CFR 575.6.

Section 9.1 contains "Trailer Tire Information".

Section 9.2 contains "Steps for Determining Correct Load Limit - Trailer".

Section 9.3 contains "Steps for Determining Correct Load Limit – Tow Vehicle".

Section 9.4 contains a Glossary of Tire Terminology, including "cold inflation pressure", "maximum inflation pressure", "recommended inflation pressure", and other non-technical terms.

Section 9.5 contains information from the NHTSA brochure entitled "Tire Safety – Everything Rides On It".

This brochure, as well as the preceding subsections, describes the following items;

- Tire labeling, including a description and explanation of each marking on the tires, and information about the DOT Tire Identification Number (TIN).
- Recommended tire inflation pressure, including a description and explanation of:
  - Cold inflation pressure.
  - Vehicle Placard and location on the vehicle.
  - Adverse safety consequences of under inflation (including tire failure).
  - Measuring and adjusting air pressure for proper inflation.
- Tire Care, including maintenance and safety practices.
- Vehicle load limits, including a description and explanation of the following items:
  - Locating and understanding the load limit information, total load capacity, and cargo capacity.
  - Calculating total and cargo capacities with varying seating configurations including quantitative examples showing / illustrating how the vehicles cargo and luggage capacity decreases as combined number and size of occupants' increases. This item is also discussed in Section 3.
  - Determining compatibility of tire and vehicle load capabilities.
  - Adverse safety consequences of overloading on handling and stopping on tires.

### **9.1 - TRAILER TIRE INFORMATION**

Trailer tires may be worn out even though they still have plenty of tread left. This is because trailer tires have to carry a lot of weight all the time, even when not in use. It is actually better for the tire to be rolling down the road than to be idle.



During use, the tire releases lubricants that are beneficial to tire life. Using the trailer tires often also helps prevent flat spots from developing.

The main cause of tire failure is improper inflation. Check the cold tire inflation pressures at least once a week for proper inflation levels. "Cold" means that the tires are at the same temperature as the surrounding air, such as when the vehicle has been parked overnight. Wheel and tire manufacturers recommend adjusting the air pressure to the trailer manufacturer's recommended cold inflation pressure, in pounds per square inch (PSI) stated on the vehicle's Federal Certification Label or Tire Placard when the trailer is loaded to its gross vehicle weight rating (GVWR). If the tires are inflated to less than the recommended inflation level or the GVWR of the trailer is exceeded, the load carrying capacity of the tire could be dramatically affected. If the tires are inflated more than the recommended inflation level, handling characteristics of the tow vehicle/trailer combination could be affected. Refer to the owner's manual or talk to your dealer or vehicle manufacturer if you have any questions regarding proper inflation practices.

Tires can lose air over a period of time. In fact, tires can lose 1 to 3 PSI per month. This is because molecules of air, under pressure, weave their way from the inside of the tire, through the rubber, to the outside. A drop in tire pressure could cause the tire to become overloaded, leading to excessive heat buildup. If a trailer tire is under-inflated, even for a short period of time, the tire could suffer internal damage.

High speed towing in hot conditions degrades trailer tires significantly. As heat builds up during driving, the tire's internal structure starts to breakdown, compromising the strength of the tire. It is recommended to drive at moderate speeds.

Statistics indicate the average life of a trailer tire is about five years under normal use and maintenance conditions. After three years, replacing the trailer tires with new ones should be considered, even if the tires have adequate tread depth. Some experts claim that after five years, trailer tires are considered worn out and should be replaced, even if they have had minimal or no use. This is such a general statement that it may not apply in all cases. It is best to have your tires inspected by a tire supplier to determine if your tires need to be replaced.

If you are storing your trailer for an extended period, make sure the tires are fully inflated to the maximum rated pressure and that you store them in a cool, dry place, such as a garage. Use tire covers to protect the trailer tires from the harsh effects of the sun.

## **9.2 - STEPS FOR DETERMINING LOAD LIMIT - TRAILER**

Determining the load limits of a trailer includes more than understanding the load limits of the tires alone. On all trailers there is a Federal Certification / VIN label that is located on the forward half of the left (road) side of the unit. This

certification/VIN label will indicate the trailer's Gross Vehicle Weight Rating (GVWR). This is the most weight the fully loaded trailer can weigh. It will also provide the Gross Axle Weight Rating (GAWR). This is the most a particular axle can weigh. If there are multiple axles, the GAWR of each axle will be provided.

If your trailer has a GVWR of 10,000 pounds or less, there is a vehicle placard located in the same location as the certification label described above. This placard provides tire and loading information. In addition, this placard will show a statement regarding maximum cargo capacity. Cargo can be added to the trailer, up to the maximum weight specified on the placard. The combined weight of the cargo is provided as a single number. In any case, remember: the total weight of a fully loaded trailer cannot exceed the stated GVWR.

For trailers with living quarters installed, the weight of water and propane also need to be considered. The weight of fully filled propane containers is considered part of the weight of the trailer before it is loaded with cargo, and is not considered part of the disposable cargo load. Water however, is a disposable cargo weight and is treated as such. If there is a fresh water storage tank of 100 gallons, this tank when filled would weigh about 800 pounds. If more cargo is being transported, water can be off-loaded to keep the total amount of cargo added to the vehicle within the limits of the GVWR so as not to overload the vehicle. Understanding this flexibility will allow you, the owner, to make choices that fit your travel needs.

When loading your cargo, be sure it is distributed evenly to prevent overloading front to back and side to side. Heavy items should be placed low and as close to the axle positions as reasonable. Too many items on one side may overload a tire. The best way to know the actual weight of the vehicle is to weigh it at a public scale. Talk to your dealer to discuss the weighing methods needed to capture the various weights related to the trailer. This would include the weight empty or unloaded, weights per axle, wheel, hitch or king-pin, and total weight.

Excessive loads and/or underinflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire. Excessive heat may lead to tire failure. It is the air pressure that enables a tire to support the load, so proper inflation is critical. The proper air pressure may be found on the Certification / VIN label and/or on the Tire Placard. This value should never exceed the maximum cold inflation pressure stamped on the tire.

## 9.2.1 - TRAILERS 10,000 POUNDS GVWR OR LESS

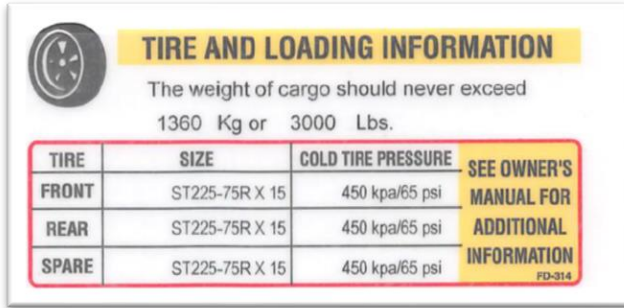


Figure 9 - 1: Example Tire Information Placard

1. Locate the statement, "The weight of cargo should never exceed XXX kg or XXX lbs.," on your vehicle's tire information placard (See figure 9-1).
2. This figure equals the available amount of cargo and luggage load capacity.
3. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity.

The trailer's placard refers to the Tire Information Placard attached adjacent to or near the trailer's VIN (Certification) label at the left front of the trailer.

## 9.2.2 - TRAILERS OVER 10,000 POUNDS GVWR

Note: These trailers are not required to have a tire information placard on the trailer and may not have one installed.

1. Determine the empty weight of your trailer by weighing the trailer using a public scale or other means. This step does not have to be repeated.
2. Locate the GVWR (Gross Vehicle Weight Rating) of the trailer on your trailer's VIN (Certification) label.
3. Subtract the empty weight of your trailer from the GVWR stated on the VIN label. That weight is the maximum available cargo capacity of the trailer and may not be safely exceeded.

## 9.3 - STEPS FOR DETERMINING LOAD LIMIT - TOW VEHICLE

1. Locate the statement, "The combined weight of occupants and cargo should never exceed XXX lbs.," on your vehicle's placard.
2. Determine the combined weight of the driver and passengers who will be riding in your vehicle.
3. Subtract the combined weight of the driver and passengers from XXX kilograms or XXX pounds.

4. The resulting figure equals the available amount of cargo and luggage capacity. For example, if the “XXX” amount equals 1500 lbs. and there will be four 160 lb. passengers in your vehicle, the amount of available cargo and luggage capacity is 860 lbs. [ $1500 - (4 \times 160) = 860$  lbs.].
5. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage capacity calculated in Step # 4.
6. If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult the tow vehicle’s manual to determine how this weight transfer reduces the available cargo and luggage capacity of your vehicle.

## **9.4 - GLOSSARY OF TIRE TERMINOLOGY**

### **Accessory weight**

The combined weight (in excess of those standard items which may be replaced) of automatic transmission, power steering, power brakes, power windows, power seats, radio and heater, to the extent that these items are available as factory-installed equipment (whether installed or not).

### **Bead**

The part of the tire that is made of steel wires, wrapped or reinforced by ply cords and that is shaped to fit the rim.

### **Bead separation**

This is the breakdown of the bond between components in the bead.

### **Bias ply tire**

A pneumatic tire in which the ply cords that extend to the beads are laid at alternate angles substantially less than 90 degrees to the centerline of the tread.

### **Carcass**

The tire structure, except tread and sidewall rubber which, when inflated, bears the load.

### **Chunking**

The breaking away of pieces of the tread or sidewall.

### **Cold inflation pressure**

The pressure in the tire before you drive.

### **Cord**

The strands forming the plies in the tire.

### **Cord separation**

The parting of cords from adjacent rubber compounds.

### **Cracking**

Any parting within the tread, sidewall, or inner liner of the tire extending to cord material.

**CT**

A pneumatic tire with an inverted flange tire and rim system in which the rim is designed with rim flanges pointed radially inward and the tire is designed to fit on the underside of the rim in a manner that encloses the rim flanges inside the air cavity of the tire.

**Curb weight**

The weight of a motor vehicle with standard equipment including the maximum capacity of fuel, oil, and coolant, and, if so equipped, air conditioning and additional weight optional engine.

**Extra load tire**

A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

**Groove**

The space between two adjacent tread ribs.

**Gross Axle Weight Rating**

The maximum weight that any axle can support, as published on the Certification / VIN label on the front left side of the trailer. Actual weight determined by weighing each axle on a public scale, with the trailer attached to the towing vehicle.

**Gross Vehicle Weight Rating**

The maximum weight of the fully loaded trailer, as published on the Certification / VIN label. Actual weight determined by weighing trailer on a public scale, without being attached to the towing vehicle.

**Hitch Weight**

The downward force exerted on the hitch ball by the trailer coupler.

**Innerliner**

The layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

**Innerliner separation**

The parting of the innerliner from cord material in the carcass.

**Intended outboard sidewall**

The sidewall that contains a white-wall, bears white lettering or bears manufacturer, brand, and/or model name molding that is higher or deeper than the same molding on the other sidewall of the tire or the outward facing sidewall of an asymmetrical tire that has a particular side that must always face outward when mounted on a vehicle.

**Light truck (LT) tire**

A tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles. May be used on trailers.

**Load rating**

The maximum load that a tire is rated to carry for a given inflation pressure.

**Maximum load rating**

The load rating for a tire at the maximum permissible inflation pressure for that tire.

**Maximum permissible inflation pressure**

The maximum cold inflation pressure to which a tire may be inflated.

**Maximum loaded vehicle weight**

The sum of curb weight, accessory weight, vehicle capacity weight, and production options weight.

**Measuring rim**

The rim on which a tire is fitted for physical dimension requirements.

**Non-pneumatic rim**

A mechanical device which, when a nonpneumatic tire assembly incorporates a wheel, supports the tire, and attaches, either integrally or separably, to the wheel center member and upon which the tire is attached.

**Non-pneumatic spare tire assembly**

A non-pneumatic tire assembly intended for temporary use in place of one of the pneumatic tires and rims that are fitted to a passenger car in compliance with the requirements of this standard.

**Non-pneumatic tire**

A mechanical device which transmits, either directly or through a wheel or wheel center member, the vertical load and tractive forces from the roadway to the vehicle, generates the tractive forces that provide the directional control of the vehicle and does not rely on the containment of any gas or fluid for providing those functions.

**Non-pneumatic tire assembly**

A non-pneumatic tire, alone or in combination with a wheel or wheel center member, which can be mounted on a vehicle.

**Normal occupant weight**

This means 68 kilograms (150 lbs.) times the number of occupants specified in the second column of Table I of 49 CFR 571.110.

**Occupant distribution**

The distribution of occupants in a vehicle as specified in the third column of Table I of 49 CFR 571.110.

**Open splice**

Any parting at any junction of tread, sidewall, or innerliner that extends to cord material.

**Outer diameter**

The overall diameter of an inflated new tire.

**Overall width**

The linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to labeling, decorations, or protective bands or ribs.

**Pin Weight**

The downward force applied to the 5th wheel or gooseneck ball, by the trailer kingpin or gooseneck coupler.

**Ply**

A layer of rubber-coated parallel cords.

**Ply separation**

A parting of rubber compound between adjacent plies.

**Pneumatic tire**

A mechanical device made of rubber, chemicals, fabric and steel or other materials, that, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.

**Production options weight**

The combined weight of those installed regular production options weighing over 2.3 kilograms (5 lbs.) in excess of those standard items which they replace, not previously considered in curb weight or accessory weight, including heavy duty brakes, ride levelers, roof rack, heavy duty battery, and special trim.

**Radial ply tire**

A pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the centerline of the tread.

**Recommended inflation pressure**

This is the inflation pressure provided by the vehicle manufacturer on the Tire Information label and on the Certification / VIN tag.

**Reinforced tire**

A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

**Rim**

A metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

**Rim diameter**

This means the nominal diameter of the bead seat.

**Rim size designation**

This means the rim diameter and width.

**Rim type designation**

This means the industry of manufacturer's designation for a rim by style or code.

**Rim width**

This means the nominal distance between rim flanges.

**Section width**

The linear distance between the exteriors of the sidewalls of an inflated tire, excluding elevations due to labeling, decoration, or protective bands.

**Sidewall**

That portion of a tire between the tread and bead.

**Sidewall separation**

The parting of the rubber compound from the cord material in the sidewall.

**Special Trailer (ST) tire**

The "ST" is an indication the tire is for trailer use only.

**Test rim**

The rim on which a tire is fitted for testing, and may be any rim listed as appropriate for use with that tire.

**Tread**

That portion of a tire that comes into contact with the road.

**Tread rib**

A tread section running circumferentially around a tire.

**Tread separation**

Pulling away of the tread from the tire carcass.

**Treadwear indicators (TWI)**

The projections within the principal grooves designed to give a visual indication of the degrees of wear of the tread.

**Vehicle capacity weight**

The rated cargo and luggage load plus 68 kilograms (150 lbs.) times the vehicle's designated seating capacity.

**Vehicle maximum load on the tire**

The load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.

**Vehicle normal load on the tire**

The load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight (distributed in accordance with Table I of CRF 49 571.110) and dividing by 2.

**Weather side**

The surface area of the rim not covered by the inflated tire.



### **Wheel center member**

In the case of a non-pneumatic tire assembly incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic rim and provides the connection between the non-pneumatic rim and the vehicle; or, in the case of a non-pneumatic tire assembly not incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic tire and provides the connection between tire and the vehicle.

### **Wheel-holding fixture**

The fixture used to hold the wheel and tire assembly securely during testing.

## **9.5 - TIRE SAFETY - EVERYTHING RIDES ON IT**

The National Traffic Safety Administration (NHTSA) has published a brochure (DOT HS 809 361) that discusses all aspects of Tire Safety, as required by CFR 575.6. This brochure is reproduced in part below. It can be obtained and downloaded from NHTSA, free of charge, from the following web site:

<https://one.nhtsa.gov/Vehicle-Safety/Tires/Tire-Safety:-Everything-Rides-On-It>

Studies of tire safety show that maintaining proper tire pressure, observing tire and vehicle load limits (not carrying more weight in your vehicle than your tires or vehicle can safely handle), avoiding road hazards, and inspecting tires for cuts, slashes, and other irregularities are the most important things you can do to avoid tire failure, such as tread separation or blowout and flat tires. These actions, along with other care and maintenance activities, can also:

- Improve vehicle handling
- Help protect you and others from avoidable breakdowns and accidents
- Improve fuel economy
- Increase the life of your tires.

This booklet presents a comprehensive overview of tire safety, including information on the following topics:

- Basic tire maintenance
- Uniform Tire Quality Grading System
- Fundamental characteristics of tires
- Tire safety tips.

Use this information to make tire safety a regular part of your vehicle maintenance routine. Recognize that the time you spend is minimal compared with the inconvenience and safety consequences of a flat tire or other tire failure.

### **9.5.1 - SAFETY FIRST - BASIC TIRE MAINTENANCE**

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Underinflated tires and overloaded vehicles are a major cause of tire failure. Therefore, as mentioned above, to avoid flat tires and other types of tire failure, you should maintain proper tire pressure,

observe tire and vehicle load limits, avoid road hazards, and regularly inspect your tires.

### **9.5.2 - FINDING YOUR VEHICLE'S RECOMMENDED TIRE PRESSURE AND LOAD LIMITS**

Tire information placards and vehicle certification labels contain information on tires and load limits. These labels indicate the vehicle manufacturer's information including:

- Recommended tire size
- Recommended tire inflation pressure
- Vehicle capacity weight (VCW—the maximum occupant and cargo weight a vehicle is designed to carry)
- Front and rear gross axle weight ratings (GAWR— the maximum weight the axle systems are designed to carry).

Both placards and certification labels are permanently attached to the trailer near the left front.

### **9.5.3 - UNDERSTANDING TIRE PRESSURE AND LOAD LIMITS**

Tire inflation pressure is the level of air in the tire that provides it with load-carrying capacity and affects the overall performance of the vehicle. The tire inflation pressure is a number that indicates the amount of air pressure—measured in pounds per square inch (psi)—a tire requires to be properly inflated. (You will also find this number on the vehicle information placard expressed in kilopascals (kPa), which is the metric measure used internationally.)

Manufacturers of passenger vehicles and light trucks determine this number based on the vehicle's design load limit, that is, the greatest amount of weight a vehicle can safely carry and the vehicle's tire size. The proper tire pressure for your vehicle is referred to as the "recommended cold inflation pressure." (As you will read below, it is difficult to obtain the recommended tire pressure if your tires are not cold.)

Because tires are designed to be used on more than one type of vehicle, tire manufacturers list the "maximum permissible inflation pressure" on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

### **9.5.4 - CHECKING TIRE PRESSURE**

It is important to check your vehicle's tire pressure at least once a month for the following reasons:

- Most tires may naturally lose air over time.

- Tires can lose air suddenly if you drive over a pothole or other object or if you strike the curb when parking.
- With radial tires, it is usually not possible to determine underinflation by visual inspection.

For convenience, purchase a tire pressure gauge to keep in your vehicle. Gauges can be purchased at tire dealerships, auto supply stores, and other retail outlets.

The recommended tire inflation pressure that vehicle manufacturers provide reflects the proper psi when a tire is cold. The term cold does not relate to the outside temperature. Rather, a cold tire is one that has not been driven on for at least three hours. When you drive, your tires get warmer, causing the air pressure within them to increase. Therefore, to get an accurate tire pressure reading, you must measure tire pressure when the tires are cold or compensate for the extra pressure in warm tires.

### **9.5.5 - STEPS FOR MAINTAINING PROPER TIRE PRESSURE**

- Step 1: Locate the recommended tire pressure on the vehicle's tire information placard, certification label, or in the owner's manual.
- Step 2: Record the tire pressure of all tires.
- Step 3: If the tire pressure is too high in any of the tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until you get to the correct pressure.
- Step 4: If the tire pressure is too low, note the difference between the measured tire pressure and the correct tire pressure. These "missing" pounds of pressure are what you will need to add.
- Step 5: At a service station, add the missing pounds of air pressure to each tire that is underinflated.
- Step 6: Check all the tires to make sure they have the same air pressure (except in cases in which the front and rear tires are supposed to have different amounts of pressure).

If you have been driving your vehicle and think that a tire is underinflated, fill it to the recommended cold inflation pressure indicated on your vehicle's tire information placard or certification label. While your tire may still be slightly underinflated due to the extra pounds of pressure in the warm tire, it is safer to drive with air pressure that is slightly lower than the vehicle manufacturer's recommended cold inflation pressure than to drive with a significantly underinflated tire. Since this is a temporary fix, don't forget to recheck and adjust the tire's pressure when you can obtain a cold reading.

### **9.5.6 - TIRE SIZE**

To maintain tire safety, purchase new tires that are the same size as the vehicle's original tires or another size recommended by the manufacturer. Look at the tire

information placard, the owner's manual, or the sidewall of the tire you are replacing to find this information. If you have any doubt about the correct size to choose, consult with the tire dealer.

### **9.5.7 - TIRE TREAD**

The tire tread provides the gripping action and traction that prevent your vehicle from slipping or sliding, especially when the road is wet or icy. In general, tires are not safe and should be replaced when the tread is worn down to 1/16 of an inch. Tires have built-in treadwear indicators that let you know when it is time to replace your tires. These indicators are raised sections spaced intermittently in the bottom of the tread grooves. When they appear "even" with the outside of the tread, it is time to replace your tires. Another method for checking tread depth is to place a penny in the tread with Lincoln's head upside down and facing you. If you can see the top of Lincoln's head, you are ready for new tires.

### **9.5.8 - TIRE BALANCE AND WHEEL ALIGNMENT**

To avoid vibration or shaking of the vehicle when a tire rotates, the tire must be properly balanced. This balance is achieved by positioning weights on the wheel to counterbalance heavy spots on the wheel-and-tire assembly. A wheel alignment adjusts the angles of the wheels so that they are positioned correctly relative to the vehicle's frame. This adjustment maximizes the life of your tires. These adjustments require special equipment and should be performed by a qualified technician.

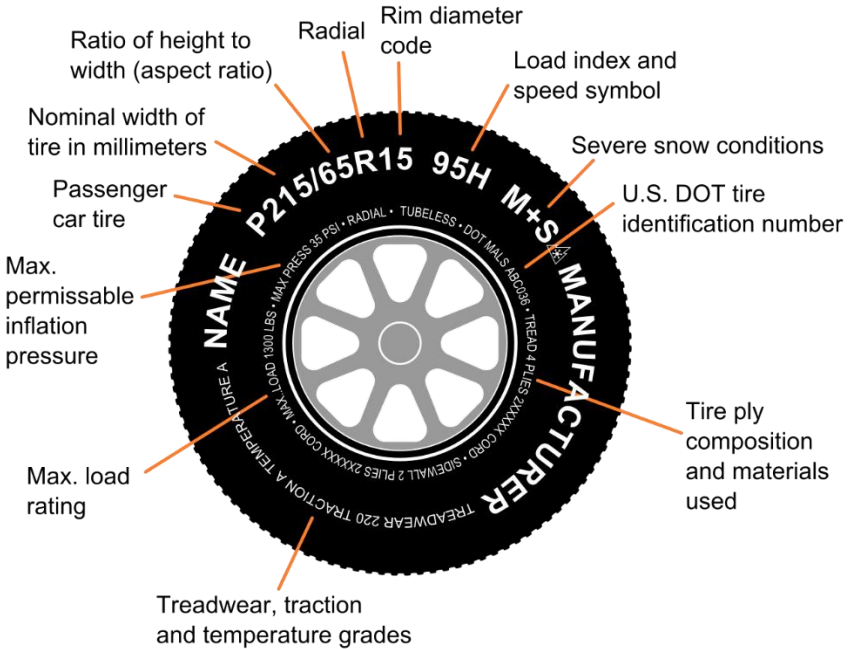
### **9.5.9 - TIRE REPAIR**

The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

### **9.5.10 - TIRE FUNDAMENTALS**

Federal law requires tire manufacturers to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

## 9.5.10.1 - INFORMATION ON PASSENGER VEHICLE TIRES



Please Refer to the diagram above.

### **P**

The "P" indicates the tire is for Passenger vehicles.

### **Next number**

This three-digit number gives the width in millimeters of the tire from sidewall edge to sidewall edge. In general, the larger the number, the wider the tire.

### **Next number**

This two-digit number, known as the aspect ratio, gives the tire's ratio of height to width. Numbers of 70 or lower indicate a short sidewall for improved steering response and better overall handling on dry pavement.

### **R**

The "R" stands for radial. Radial ply construction of tires has been the industry standard for the past 30 years.

### **Next number**

This two-digit number is the wheel or rim diameter in inches. If you change your wheel size, you will have to purchase new tires to match the new wheel diameter.

### **Next number**

This two- or three-digit number is the tire's load index. It is a measurement of how much weight each tire can support. You may find this information in your owner's manual. If not, contact a local tire dealer. Note: You may not find this information on all tires because it is not required by law.

### **M+S**

The "M+S" or "M/S" indicates that the tire has some mud and snow capability. Most radial tires have these markings; hence, they have some mud and snow capability.

### **Speed Rating**

The speed rating denotes the speed at which a tire is designed to be driven for extended periods of time. Note: You may not find this information on all tires because it is not required by law.

### **U.S. DOT Tire Identification Number**

This begins with the letters "DOT" and indicates that the tire meets all federal standards. The next two numbers or letters are the plant code where it was manufactured, and the last four numbers represent the week and year the tire was built. For example, the numbers 3197 mean the 31<sup>st</sup> week of 1997. The other numbers are marketing codes used at the manufacturer's discretion. This information is used to contact consumers if a tire defect requires a recall.

### **Tire Ply Composition and Materials Used**

The number of plies indicates the number of layers of rubber-coated fabric in the tire. In general, the greater the number of plies, the more weight a tire can support. Tire manufacturers also must indicate the materials in the tire, which include steel, nylon, polyester, and others.

### **Maximum Load Rating**

This number indicates the maximum load in kilograms and pounds that can be carried by the tire.

### **Maximum Permissible Inflation Pressure**

This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

## **9.5.10.2 - UTQGS (UNIFORM TIRE QUALITY GRADING STANDARDS) INFORMATION**

### **Treadwear Number**

This number indicates the tire's wear rate. The higher the treadwear number is, the longer it should take for the tread to wear down. For example, a tire graded 400 should last twice as long as a tire graded 200.

### **Traction Letter**

This letter indicates a tire's ability to stop on wet pavement. A higher graded tire should allow you to stop your car on wet roads in a shorter distance than a tire with a lower grade. Traction is graded from highest to lowest as "AA", "A", "B", and "C".

### **Temperature Letter**

This letter indicates a tire's resistance to heat. The temperature grade is for a tire that is inflated properly and not overloaded. Excessive speed, underinflation or excessive loading, either separately or in combination, can cause heat build-up and possible tire failure. From highest to lowest, a tire's resistance to heat is graded as "A", "B", or "C".

### **9.5.10.3 - INFORMATION ON LIGHT TRUCK TIRES**

Tires for light trucks have other markings besides those found on the sidewalls of passenger tires.

#### **LT**

The "LT" indicates the tire is for light trucks or trailers.

#### **Max. Load Dual kg (lbs) at kPa (psi) Cold**

This information indicates the maximum load and tire pressure when the tire is used as a dual, that is, when four tires are put on each rear axle (a total of six or more tires on the vehicle).

#### **Max. Load Single kg (lbs) at kPa (psi) Cold**

This information indicates the maximum load and tire pressure when the tire is used as a single.

#### **Load Range**

This information identifies the tire's load carrying capabilities and its inflation limits.

### **9.5.10.4 - INFORMATION ON SPECIALTY TRAILER TIRES**

Tires designated for trailers only have other markings besides those found on the sidewalls of passenger tires.

#### **ST**

An "ST" is an indication the tire is for trailer use only. "ST" tires are designed for carrying heavy loads at lower speeds.

The Tire and Rim Association Standard indicates that for operation at speeds up to 65 mph, no change in maximum cold tire inflation pressure or load is required. For speeds between 66-75 mph, increase the maximum cold tire inflation pressure 10 psi.

#### **Max. Load Dual kg (lbs) at kPa (psi) Cold**

This information indicates the maximum load and tire pressure when the tire is used as a dual, that is, when four tires are put on each rear axle (a total of six or more tires on the vehicle).

#### **Max. Load Single kg (lbs) at kPa (psi) Cold**

This information indicates the maximum load and tire pressure when the tire is used as a single.

## **Load Range**

This information identifies the tire's load carrying capabilities and its inflation limits.

### **9.5.1 1 - TIRE SAFETY TIPS**

#### **Preventing Tire Damage**

- Slow down if you have to go over a pothole or other object in the road.
- Do not run over curbs or other foreign objects in the roadway, and try not to strike the curb when parking.

#### **Tire Safety Checklist**

- Check tire pressure regularly (at least once a month), including the spare.
- Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma.
- Remove bits of glass and foreign objects wedged in the tread.
- Make sure your tire valves have valve caps.
- Check tire pressure before going on a long trip.
- Do not overload your vehicle. Check the tire information placard or owner's manual for the maximum recommended load for the vehicle.



## 10 - TECHNICAL REFERENCE

The figure below illustrates the 7-way RV electrical plug and wiring colors used on trailers manufactured by Shadow Trailers.

# SHADOW



7-way RV  
Electrical Connector  
(Trailer End)