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Portions of this manual were used with the expressed authority of Dexter Axle, but Dexter Axle is not responsible for the accuracy of the information contained herein.

# **1 INTRODUCTION**

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## **1.1 INTRODUCTION**

Read and understand this manual before using your trailer and follow all of the safety instructions. Keep all manuals in a safe place at all times.

Some components on your trailer may have separate instruction manuals. Where this manual indicates that you should read another manual, and you do not have that manual, contact your Primo Trailer dealer for assistance.


Information provided in this manual was current as of the issue date. Primo Trailer reserves the right to make design changes without further notice or liability.

## 2 GENERAL SAFETY INFORMATION

### 2.1 SAFETY ALERT SYMBOLS AND SIGNAL WORDS

An Owner's Manual that provides general trailer information cannot cover all of the specific details necessary for the proper combination of every trailer, tow vehicle and hitch. 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, contact your dealer for assistance.

The safety information in this manual is denoted by the safety alert symbol: . The level of risk is indicated by the following signal words.

#### 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 for loss of control of the trailer are:

- Improper sizing the trailer for the tow vehicle, or vice versa.
- Excessive Speed: Driving too fast for the conditions.
- Failure to adjust driving behavior when towing a trailer.
- Overloading and/or improper weight distribution.
- Improper coupling of the trailer to the hitch.
- Improper braking and steering under sway conditions.
- Not maintaining proper tire pressure.
- Not keeping lug nuts tight.

#### 2.2.1 IMPROPER SIZING OF THE TRAILER TO THE TOW VEHICLE.

Trailers that weigh too much for the towing vehicle can cause stability problems, which can lead to death or serious injury. Furthermore, the additional strain put on the engine and drive-train may lead to serious tow vehicle maintenance problems. For these reasons the maximum towing capacity of your towing vehicle should not be exceeded. The towing capacity of your tow vehicle, in terms of maximum Gross Trailer Weight (GTW) and maximum Gross Combined Weight Rating (GCWR) can be found in the tow vehicles Owner's Manual.

#### DANGER

Use of an under-rated hitch, ball or tow vehicle can result in loss of control leading to death or serious injury.

Make certain your hitch and tow vehicle are rated for your trailer.

#### 2.2.2 DRIVING TOO FAST

With ideal road conditions, the maximum recommended speed for safely towing a trailer is 60 mph. If you drive too fast, the trailer is more likely to sway, thus increasing the possibility for loss of control. Also your tires may overheat, thus increasing the possibility of a blowout.

#### WARNING

Driving too fast for conditions can result in loss of control and cause death or serious injury.

Adjust speed down when towing trailer.

## General Safety Information

### 2.2.3 FAILURE TO ADJUST DRIVING BEHAVIOR WHEN TOWING A TRAILER

When towing a trailer, you will have decreased 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). Furthermore the trailer will change the handling characteristics of your towing vehicle, making it more sensitive to steering inputs and more likely to be pushed around in windy conditions or when being passed by large vehicles. In addition, you will need a longer distance to pass, due to slower acceleration and increased length. With this in mind:

- Be alert for slippery conditions. You are more likely to be affected by slippery road surfaces when driving a tow vehicle with a trailer, than driving a tow vehicle without a trailer.
- Anticipate the trailer "swaying." Swaying can be caused by excessive steering, wind gusts, roadway edges, or by the trailer's reaction to the pressure wave created by passing trucks and busses.
- When encountering trailer sway take your foot off the accelerator, and steer as little as possible in order to stay on the road. Use small "trim-like" steering adjustments. Do not attempt to steer out of the sway; you'll only make it worse. Also do not apply the tow vehicle brakes to correct trailer swaying. On the other hand, application of the trailer brakes alone will tend to straighten out the combination, especially when going downhill.
- Check rearview 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, roofed areas and around trees.

### 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 death or serious injury to you and to others.



#### WARNING

Proper selection and condition of the coupler and hitch are essential to safely towing your trailer. A loss of coupling may result in death or serious injury.

- Be sure the hitch load rating is equal to or greater than the load rating of the coupler.
- Be sure the hitch size matches the coupler size.
- Observe the hitch for wear, corrosion and cracks before coupling. Replace worn, corroded or cracked hitch components before coupling the trailer to the tow vehicle.
- Be sure the hitch components are tight before coupling the trailer to the tow vehicle.



#### WARNING

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

Do not move the trailer until:

- The coupler is secured and locked to hitch;
- 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:

- Tires and wheels are checked;
- 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

If your trailer comes loose from the hitch for any reason, we have provided safety chains so that control of the trailer can still be maintained.

## General Safety Information

### WARNING

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

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

### 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 comes loose from the hitch for any reason. The breakaway brake system, including battery, must be in good condition and properly rigged to be effective.

### WARNING

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

The breakaway lanyard must be connected to the tow vehicle, and NOT to any part of the hitch.

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.

### 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 death or serious injury.

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 death or serious injury.

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

### 2.2.8 WORN TIRES, LOOSE WHEELS AND 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 cool-down after driving as much as 1 mile at 40 mph before checking tire pressure.

### WARNING

Improper tire pressure may cause unstable trailer. Blowout and loss of control may occur. Death or serious injury can 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. Before each tow, check to make sure they are tight.

### WARNING

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

Death or injury can occur if wheel comes off.

Tighten lug nuts (bolts) before each tow.

The proper tightness (torque) for lug nuts and tightening sequence is listed in the maintenance section of this manual and also in the axle manual provided with your trailer.

Use a torque wrench to tighten the lug nuts and use the crisscross star pattern sequence.

## General Safety Information

Lug nuts are also prone to loosen after first being assembled. When driving a new trailer (or after wheels have been remounted), check to make sure they are tight 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 separating from the trailer and a crash, leading to death or serious injury.

**⚠ WARNING**

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

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

**⚠ WARNING**

**Inadequate lug nut torque can cause a wheel separating from the trailer. Death or serious injury can result.**

**Be sure lug nuts are tight before each tow.**

### 2.2.9 IMPROPER LOADING

The total weight of the load 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 weight of the trailer plus the cargo weight, you must weigh the loaded trailer at a commercial scale. In addition, you must distribute the load in the trailer such that the load on any axle does not exceed the Gross Axle Weight Rating (GAWR). If your trailer is equipped with a Tire & Loading Information Placard, mounted next to the Certification / VIN label, the cargo capacity weight stated on that placard is only a close estimate. The GVWR and GAWR's are listed on the Certification / VIN label mounted on the front left side of the trailer.

**⚠ WARNING**

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

**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 the Chapter heading "Loading the Trailer" for more information.

In the following table, the second column shows the rule of thumb percentage of total weight of the trailer plus its cargo (Gross Trailer Weight, or "GTW") that should appear on the tongue of the trailer. For example, a smaller utility trailer with a bumper pull hitch, with a loaded weight of 12,000 pounds, should have 6-10% of 12,000 pounds (720-1200 lbs.) on the tongue.

Tongue Weight as a Percentage of Loaded Trailer Weight	
Type of Trailer	Percentage
Bumper Pull	10–15% for large trailers 6–10% for smaller utility trailers

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.

## General Safety Information

### WARNING

Improper tongue weight (load distribution) can result in loss of control of the trailer, leading to death or serious injury.

Make certain that tongue weight is within the allowable range.

Be sure to:

- Distribute the load front-to-rear to provide proper tongue weight (see chart). For dump trailers, a flowable load should be evenly distributed throughout the body.
- Distribute the load evenly, right and left.
- Keep the center of gravity low.

### 2.2.11 SHIFTING CARGO

Since the trailer ride can be bumpy and rough, you must secure your cargo so that 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 lead to death or serious injury.

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

If the trailer is equipped with a ramp or ramps, verify that the ramps are in the transport position and secured with a pin and safety lock pin (if equipped).

### WARNING

Unsecured ramps can create a driving hazard.

Secure ramps in their transport position before towing trailer.

### 2.2.12 INAPPROPRIATE CARGO

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.

### WARNING

Never transport people on your trailer. Besides putting their lives at risk, the transport of people is illegal.

### WARNING

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

- The exception is fuel in the tank of a vehicle or equipment being hauled.

### 2.2.13 INOPERABLE BRAKES, LIGHTS OR MIRRORS

Be sure that the electric brakes 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 tail lights 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. Do the same thing to check the turn signal lights.

If your trailer has electric brakes, your tow vehicle will 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 your trailer has hydraulic surge brakes, pull the emergency breakaway brake lanyard to check the operation of the surge mechanism.

### WARNING

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

Before each tow:

- Check that all lights and turn signals work.
- Check 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 approaching traffic.



## General Safety Information

### 2.2.14 HAZARDS FROM MODIFYING YOUR TRAILER

Before making any alteration to your trailer, contact your Primo Trailer dealer and describe the alteration you are contemplating. Alteration of the trailer structure or modification of your trailer must be approved in writing by

the trailer manufacturer and performed only by qualified technicians who are familiar with your trailer.

Unauthorized alteration of the trailer structure or modification of your trailer will void the warranty.

### 2.2.15 SAFETY WARNING LABELS ON YOUR TRAILER

Only one of the following decals will be on any given trailer. Decals are shown at 1/3 scale.

<b>▲ WARNING</b>	<b>▲ WARNING</b>	<b>▲ WARNING</b>	<b>▲ WARNING</b>	<b>▲ WARNING</b>
<p>Uncoupling will cause trailer to come loose from tow vehicle. You must:</p> <ol style="list-style-type: none"> <li>1. CHECK that ball <b>LOAD RATING</b> is same as or greater than coupler <b>LOAD RATING</b>.</li> <li>2. CHECK that ball <b>SIZE</b> is same as coupler.</li> <li>3. CLOSE COUPLER CLAMP on ball.</li> <li>4. LIFT coupler upwards to test that it will not separate from ball.</li> <li>5. LOCK coupler clamp with pin or padlock.</li> </ol>	<p><b>ALWAYS use safety chains. Chains hold trailer if connection fails. You must:</b></p> <ol style="list-style-type: none"> <li>1. CROSS chains underneath coupler.</li> <li>2. ALLOW slack for trailer to turn.</li> <li>3. ATTACH chain hooks securely to tow vehicle frame.</li> </ol>	<p>Trailer can roll if it comes loose. Electric safety brake applies when saddle pin out of switch box. You must:</p> <ol style="list-style-type: none"> <li>1. PULL lever to get pin out of switch box.</li> <li>2. CHECK brake by PULLING TRAILER with tow vehicle.</li> <li>3. ATTACH pin CABLE to tow vehicle so pin will be pulled out if trailer separates.</li> <li>4. Promptly REPLACE pin in switch box.</li> </ol>	<p>Lights can prevent trailer from being hit by other vehicles. You must:</p> <ol style="list-style-type: none"> <li>1. CONNECT trailer and tow vehicle electrical connectors.</li> <li>2. CHECK all lights: tail lights, turn signal, and brake lights.</li> <li>3. DO NOT TOW if lights are not working.</li> </ol>	<p>This wheel or signal failure can cause loss of control. Before leaving, you must CHECK:</p> <ol style="list-style-type: none"> <li>1. Tire pressure and tread.</li> <li>2. Tires and wheels for damage.</li> <li>3. Lug nuts for tightness.</li> </ol> <p>For new and remounted wheels, re-tighten lug nuts at the first 10, 25 and 50 miles of driving.</p>

<b>▲ WARNING</b>	<b>▲ WARNING</b>	<b>▲ WARNING</b>	<b>▲ WARNING</b>	<b>▲ WARNING</b>
<p><b>ALWAYS use safety chains. Chains hold trailer if connection fails. You must:</b></p> <ol style="list-style-type: none"> <li>1. CROSS chains underneath coupler.</li> <li>2. ALLOW slack for trailer to turn.</li> <li>3. ATTACH chain hooks securely to tow vehicle frame.</li> <li>5. LOCK coupler clamp with pin or padlock.</li> </ol>	<p>Uncoupling will cause trailer to come loose from tow vehicle. You must:</p> <ol style="list-style-type: none"> <li>1. CHECK that ball <b>LOAD RATING</b> is same as or greater than coupler <b>LOAD RATING</b>.</li> <li>2. CHECK that ball <b>SIZE</b> is same as coupler.</li> <li>3. CLOSE COUPLER CLAMP on ball.</li> <li>4. LIFT coupler upwards to test that it will not separate from ball.</li> <li>5. LOCK coupler clamp with pin or padlock.</li> </ol>	<p>Trailer can roll if it comes loose. Safety brake applies when chain pulls brake lever. You must:</p> <ol style="list-style-type: none"> <li>1. ATTACH brake CHAIN securely to tow vehicle so lever will be pulled if trailer separates.</li> <li>2. CHECK brake fluid level.</li> <li>3. DO NOT TOW if brake fluid is NOT FULL.</li> </ol>	<p>Lights can prevent trailer from being hit by other vehicles. You must:</p> <ol style="list-style-type: none"> <li>1. CONNECT trailer and tow vehicle electrical connectors.</li> <li>2. CHECK all lights: tail lights, turn signal, and brake lights.</li> <li>3. DO NOT TOW if lights are not working.</li> </ol>	<p>This wheel or signal failure can cause loss of control. Before leaving, you must CHECK:</p> <ol style="list-style-type: none"> <li>1. Tire pressure and tread.</li> <li>2. Tires and wheels for damage.</li> <li>3. Lug nuts for tightness.</li> </ol> <p>For new and remounted wheels, re-tighten lug nuts at the first 10, 25 and 50 miles of driving.</p>

<b>▲ WARNING</b>	<b>▲ WARNING</b>	<b>▲ WARNING</b>	<b>▲ WARNING</b>	<b>▲ WARNING</b>
<p>Uncoupling will cause trailer to come loose from tow vehicle. You must:</p> <ol style="list-style-type: none"> <li>1. CHECK that ball <b>LOAD RATING</b> is same as or greater than coupler <b>LOAD RATING</b>.</li> <li>2. CHECK that ball <b>SIZE</b> is same as coupler.</li> <li>3. CLOSE COUPLER CLAMP on ball.</li> <li>4. LIFT coupler upwards to test that it will not separate from ball.</li> <li>5. LOCK sleeve with pin or padlock.</li> </ol>	<p><b>ALWAYS use safety chains. Chains hold trailer if connection fails. You must:</b></p> <ol style="list-style-type: none"> <li>1. CROSS chains underneath coupler.</li> <li>2. ALLOW slack for trailer to turn.</li> <li>3. ATTACH chain hooks securely to tow vehicle frame.</li> </ol>	<p>Trailer can roll if it comes loose. Electric safety brake applies when saddle pin out of switch box. You must:</p> <ol style="list-style-type: none"> <li>1. PULL lever to get pin out of switch box.</li> <li>2. CHECK brake by PULLING TRAILER with tow vehicle.</li> <li>3. ATTACH pin CABLE to tow vehicle so pin will be pulled out if trailer separates.</li> <li>4. Promptly REPLACE pin in switch box.</li> </ol>	<p>Lights can prevent trailer from being hit by other vehicles. You must:</p> <ol style="list-style-type: none"> <li>1. CONNECT trailer and tow vehicle electrical connectors.</li> <li>2. CHECK all lights: tail lights, turn signal, and brake lights.</li> <li>3. DO NOT TOW if lights are not working.</li> </ol>	<p>This wheel or signal failure can cause loss of control. Before leaving, you must CHECK:</p> <ol style="list-style-type: none"> <li>1. Tire pressure and tread.</li> <li>2. Tires and wheels for damage.</li> <li>3. Lug nuts for tightness.</li> </ol> <p>For new and remounted wheels, re-tighten lug nuts at the first 10, 25 and 50 miles of driving.</p>

*Safety Warning Label - Bumper Pull Trailers*

## General Safety Information

### WARNING

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

If any of these labels are missing or cannot be read, contact your Aluma, Ltd. dealer for replacement labels.

You will need to provide us with the number shown at the bottom of the label(s) in order for us to send the correct one(s).

### 2.2.16 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.

### 2.2.17 SAFE TRAILER TOWING GUIDELINES

- Recheck the load tie downs to make sure the load will not shift during towing.
- Before towing, check coupling, safety chain, safety brake, tires, wheels and lights.
- Check the lug nuts or bolts for tightness. Refer to the Service and Maintenance Section.
- 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 that 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. Generally 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.
- To conserve fuel, don't use full throttle to climb a hill. Instead, build speed on the approach.
- 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.

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## General Safety Information

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- Make regular stops, about once each hour. Confirm that
  - The coupler is secure to the hitch and is locked,
  - Electrical connectors are made,
  - There is appropriate slack in the safety chains,
  - There is appropriate slack in the breakaway switch pullpin cable,
  - The tires are not visibly low on pressure, and
  - The cargo is secure and in good condition.

### 2.2.18 REPORTING SAFETY DEFECTS

If you believe that 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 us.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that 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 us.

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

Administrator, NHTSA,  
1200 New Jersey Avenue S.E.  
Washington, DC 20590

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

## 3 TIRE SAFETY INFORMATION

This portion of the User's Manual contains tire safety information as required by 49 CFR 575.6.

Section 3.1 contains "[Trailer Tire Information](#)".

Section 3.2 contains "[Steps for Determining Correct Load Limit - Trailer](#)".

Section 3.3 contains "[Steps for Determining Correct Load Limit - Tow Vehicle](#)".

Section 3.4 contains a [Glossary of Tire Terminology](#), including "cold inflation pressure", "maximum inflation pressure", "recommended inflation pressure", and other non-technical terms.

Section 3.5 contains information from the NHTSA brochure entitled "[Tire Safety - Everything Rides On It](#)".

This brochure, as well as the preceding subsections, describe 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.

### 3.1 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 build up. 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.

## Tire Safety Information

### 3.2 STEPS FOR DETERMINING CORRECT 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 can not exceed the stated GVWR.

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.

#### 3.2.1 TRAILERS UNDER 10,000 POUNDS GVWR

TIRE AND LOADING INFORMATION			
The weight of cargo should never exceed 907 kg. or 2000 lbs.			
TIRE	SIZE	COLD TIRE PRESSURE	SEE OWNER'S
FRONT	20.5x8.5-150E	62PSI/A or 90PSI/B	MANUAL FOR
REAR			ADDITIONAL
SPARE			INFORMATION

*Tire Information Placard – Figure 3-1*

- Locate the statement, "The weight of cargo should never exceed XXX kg or XXX lbs.," on your vehicle's placard. See figure 3-1.
- This figure equals the available amount of cargo and luggage load capacity.
- 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.

#### 3.2.2 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)**

- Determine the empty weight of your trailer by weighing the trailer using a public scale or other means.
- Locate the GVWR (Gross Vehicle Weight Rating) of the trailer on your trailer's VIN (Certification) label.
- 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.

### 3.3 STEPS FOR DETERMINING CORRECT LOAD LIMIT – TOW VEHICLE

- Locate the statement, "The combined weight of occupants and cargo should never exceed XXX lbs.," on your vehicle's placard.
- Determine the combined weight of the driver and passengers who will be riding in your vehicle.
- Subtract the combined weight of the driver and passengers from XXX kilograms or XXX pounds.
- The resulting figure equals the available amount of cargo and luggage capacity. For example, if the "XXX" amount equals 1400 lbs. and there will be five 150 lb. passengers in your vehicle, the amount of available cargo and luggage capacity is 650 lbs. (1400-750 (5 x 150) = 650 lbs.).
- 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 previous step.
- 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.

### 3.4 GLOSSARY OF TIRE TERMINOLOGY

**Accessory weight** The combined weight (in excess of those standard items which may be replaced) of

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## Tire Safety Information

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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 non-pneumatic tire assembly incorporates a wheel, supports the tire, and attaches, either integrally or separately, 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

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## Tire Safety Information

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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 5<sup>th</sup> 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.

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**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 separately, 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 separately, 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.  
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:

[http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires\\_index.html](http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires_index.html)

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.

### 3.4.1 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.

### 3.4.2 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.

### 3.4.3 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.



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## Tire Safety Information

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### 3.4.4 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.

### 3.4.5 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.

### 3.4.6 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.

### 3.4.7 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 2/32 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.

### 3.4.8 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.

### 3.4.9 TIRE REPAIR

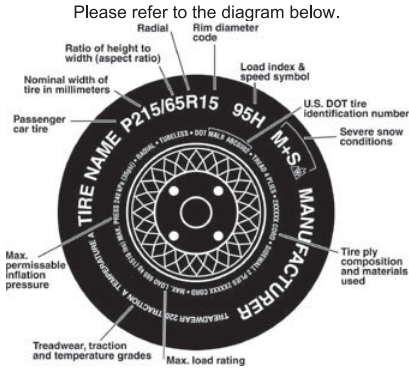
The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

### 3.4.10 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.

Information on Passenger Vehicle Tires

## Tire Safety Information



**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 20 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. The ratings range from 99 miles per hour (mph) to 186 mph. These ratings are listed below. Note: You may not find this information on all tires because it is not required by law.

Letter Rating	Speed Rating
Q	99 mph
R	106 mph
S	112 mph
T	118 mph
U	124 mph
H	130 mph
V	149 mph
W	168* mph
Y	186* mph

\* For tires with a maximum speed capability over 149 mph, tire manufacturers sometimes use the letters ZR. For those with a maximum speed capability over 186 mph, tire manufacturers always use the letters ZR.

**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 means the 31st 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.

**UTQGS 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

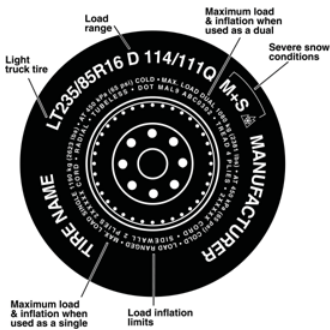
## Tire Safety Information

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".

Additional Information on Light Truck Tires  
Please refer to the following diagram.



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.

### ST

An "ST" is an indication the tire is for trailer use only.

### 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.

## 3.4.11 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.

## 4 COUPLING TO THE 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.

### 4.1 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 the trailer's rated capacity is less than or equal to the tow vehicle's rated towing capacity.

#### 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 death or serious injury.

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 death or serious injury.

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

#### 4.1.1 TRAILER INFORMATION

The Certification / Vehicle Identification Number (VIN) tag is located on the front left side of your trailer.

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

**MFD BY:** Aluma, Ltd – Bancroft, IA

**DATE OF MFD:** 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 cargo.

**GAWR (ALL AXLES):** The Gross Axle Weight Rating is the maximum gross weight that all the axles combined can support. It is the lowest of axle, wheel, or tire rating.

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.

**TIRE SIZE:** The recommended tire size for your trailer.

**RIM SIZE:** The recommended rim size for your trailer.

**KPA (PSI):** The Kilopascals and Pounds per Square Inch recommended tire pressure measured when the tires are cold.

**SINGLE/DUAL:** Identifies if the trailer is equipped with single or dual wheels.

**VIN:** The Vehicle Identification Number.

**TYPE OF VEHICLE:** Trailer and the trailer model number.

**CERTIFICATION STATEMENT:** "This vehicle conforms to all applicable U.S. Federal Motor Vehicle Safety Standards (FMVSS) in effect on the date of manufacture shown above".

#### 4.1.2 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.

##### **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.

**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.

**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.

**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

## Coupling To The Tow Vehicle

position. The brake controller is not the same as the safety brakeaway brake system that is installed on the trailer.

**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.

**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.

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

**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.

**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.

**Fire Extinguisher:** It is sensible to have a fire extinguisher in the tow vehicle.

### 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.

## 4.2 COUPLING AND UNCOUPLING THE TRAILER

A secure coupling (or fastening) 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 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.

**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.

**Safety chains:** Chains permanently attached to the trailer such that if the coupler connection comes loose, the safety chains can keep the trailer attached to the tow vehicle. With properly rigged safety chains, 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 lanyard, attached independently to the tow vehicle hitch, will activate the brakes on the trailer. Be sure to allow enough slack in the breakaway brake lanyard such that the brakes will only activate if the coupler connection comes loose.

**Jack:** A device on the trailer that is used to raise and lower the trailer tongue. On larger trailers the jack is sometimes called the "landing gear."



### WARNING

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

Do not move the trailer until:

- The coupler is secured and locked to hitch;
- The safety chains are secured to the tow vehicle; and
- The trailer jacks are fully retracted.

Do not tow the trailer on the road until:

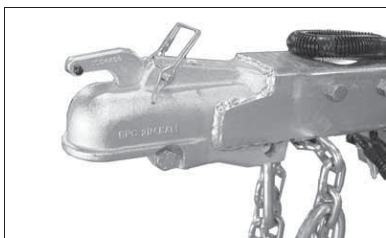
- Tires and wheels are checked;
- The trailer brakes are checked;
- The breakaway lanyard is connected to the tow vehicle;
- The load is secured to the trailer; and
- The trailer lights are connected and checked.

## Coupling To The Tow Vehicle

### 4.3 TAGALONG TRAILERS

#### 4.3.1 TRAILER WITH BALL HITCH COUPLER

A ball hitch coupler connects to a ball that is located on or under the rear bumper of tow vehicle.



*Ball Hitch Coupler - Figure 4-1*

We have utilized a ball hitch coupler that is suitable for the size and weight of the trailer. See figure 4-1. 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.**

The ball size and load rating (capacity) are marked on the ball; hitch capacity is marked on the hitch. Before Coupling The Trailer To The Tow Vehicle Be sure the size and rating of hitch ball match the size and rating of the coupler. Hitch balls and couplers are marked with their size and rating.

#### **⚠ WARNING**

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

**Be sure the LOAD RATING of the hitch ball is equal or greater than the load rating of the coupler.**

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

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

#### **⚠ WARNING**

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

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

**Replace worn or damaged hitch ball.**

- Verify that the ball 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 death or serious injury.**

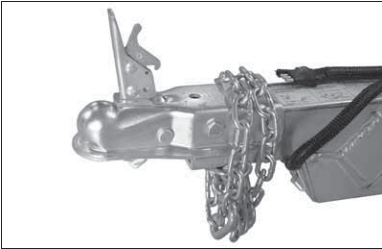
**Make sure the hitch ball is tight to the hitch before coupling the trailer.**

- Raise the bottom surface of the coupler to be above the top of the hitch ball.

#### **4.3.1.1 Prepare the Coupler and Hitch**

- Lubricate the hitch ball and the inside of the coupler with a thin layer of automotive bearing grease.
- Unlock and open the coupler locking mechanism. In the open position, the coupler is able to drop fully onto the hitch ball. The following three illustrations show the various tagalong couplers in the open position.

## Coupling To The Tow Vehicle



*Coupler Locking Mechanism Open - Figure 4-2*

- Slowly back up the tow vehicle so that the hitch ball is aligned under the coupler.

### 4.3.1.2 Couple the Trailer to the Tow Vehicle

- Lower the trailer tongue until the coupler fully engages the hitch ball. If the coupler does not line up with the hitch ball, adjust the position of the tow vehicle.
- Engage the coupler locking mechanism. In the engaged position, the locking mechanism securely holds the coupler to the hitch ball.
- Insert the safety lock pin through the hole in the coupler locking mechanism.



*Coupler Locking Mechanism Closed - Figure 4-3*



*Coupler Locking Mechanism Closed - Figure 4-4*

- Be sure the coupler is all the way on the hitch ball and the locking mechanism is engaged. A properly engaged locking mechanism will allow the coupler to raise the rear of the tow vehicle. If the trailer has a 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.

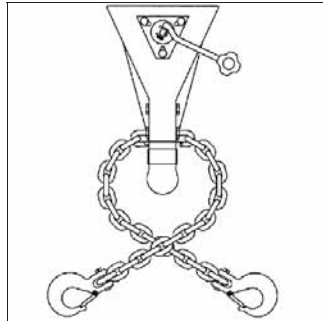
### **NOTICE**

**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 for assistance.

- Lower the trailer so that its entire tongue weight is held by the hitch, and continue retracting the jack to its fully retracted position.
- Fully retract jack drop leg and insert pin.

### 4.3.2 RIG THE SAFETY CHAINS



*Proper Safety Chain Arrangement - Figure 4-5*

- 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 4-5.
  - 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 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.

## Coupling To The Tow Vehicle

### WARNING

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

Chains must:

- Fasten to frame of tow vehicle, not to hitch or ball.
- Cross underneath hitch and coupler with minimum slack to permit turning and to hold tongue up, if the trailer comes loose.

### 4.3.3 CONNECT THE ELECTRICAL CABLE

Connect the trailer lights to the tow vehicle's electrical system.

- Check **all** lights for proper operation. Repair if needed.
- Check electric brakes for proper operation using brake controller mounted in the cab (if equipped).

### WARNING

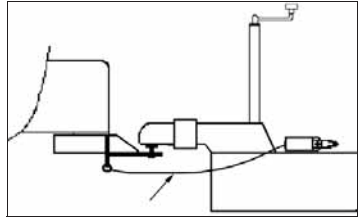
Improper electrical connection between the tow vehicle and the trailer will result in inoperable lights and electric brakes, and can lead to collision.

Before each tow:

- Check that **all** lights and turn signals work.
- Check that the electric brakes work by operating the brake controller inside the tow vehicle.

### 4.3.4 CONNECT BREAKAWAY BRAKE LANYARD

Connect the breakaway brake lanyard to the tow vehicle so that the pullpin will be pulled out, or surge actuator will be activated out before all of the slack in the safety chains is taken up. See figure 4-6. Do **not** connect the lanyard to a safety chain, hitch ball or hitch ball assembly. This would keep the breakaway brake system from operating when it is needed.



Breakaway Brake Lanyard - Figure 4-6

#### 4.3.4.1 Test Electric Brake Operation

If your trailer has electric brakes, your tow vehicle will 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 m.p.h., manually operate the electric brake controller in the tow vehicle cab. You should feel the operation of the trailer brakes.

#### 4.3.4.2 Test Electric Breakaway Brake System

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

The breakaway brake system includes a battery, a switch with a pullpin and lanyard, and a breakaway brake controller.

The breakaway brake system battery will trickle charge from the tow vehicle. If the electrical system on your tow vehicle does not provide power to the battery, you must periodically charge the battery with a commercial battery charger to keep the battery charged.

Do not tow trailer if the battery requires recharging. A discharged breakaway brake battery will not activate the brakes if the trailer uncouples from the tow vehicle. The battery must be fully charged before towing trailer.

- To test the breakaway brake battery, remove the pullpin 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 battery, are repaired.
- Immediately replace the pullpin. The breakaway brake system battery discharges rapidly when the pullpin is removed.



## Coupling To The Tow Vehicle

### **WARNING**

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

**Connect the breakaway cable to the tow vehicle; and NOT to the 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. Have it serviced or repaired.**

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

### **WARNING**

**Failure to replace the pullpin can result in ineffective brakes, 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 battery according to the intervals specified by battery manufacturer.

### **WARNING**

**The breakaway system is designed to operate if the trailer separates from the tow vehicle.**

**DO NOT use the breakaway system as a parking brake.**

### 4.3.5 UNCOUPLING A TAGALONG TRAILER

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

- Park the trailer on a firm level surface
- Block trailer tires to prevent the trailer from rolling, before jacking the trailer up.
- Disconnect the electrical connector.
- Disconnect the breakaway brake switch lanyard.
- Disconnect the safety chains 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.

- Rotate the jack handle to extend the jack and transfer the weight of the trailer tongue to the jack.
- Raise the coupler to above the tow vehicle hitch.

### 4.4 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 insure 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 smaller utility trailer with a bumper pull hitch, with a loaded weight of 12,000 pounds, should have 6-10% of 12,000 pounds (720-1200 lbs.) on the tongue.

Tongue Weight as a Percentage of Loaded Trailer Weight	
Type of Trailer	Percentage
Bumper Pull	10-15% for large trailers 6-10% for smaller utility trailers

## Coupling To The Tow Vehicle



### WARNING

**Improper tongue weight (load distribution) can result in loss of control of the trailer, leading to death or serious injury.**

**Make certain that tongue weight is within the allowable range.**

**Be sure to:**

- **Distribute the load front-to-rear to provide proper tongue weight (see chart);**
- **Distribute the load evenly, right and left, to avoid tire overload; and**
- **Keep the center of gravity low.**

### 4.5 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.

Take your trailer to a truck stop or grain elevator where there is a certified scale. Place the tow vehicle only onto the scale and get the weight. This weight must be less than your tow vehicle's GVWR. 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. Re-connect 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. Simply subtract the axle weight from the total weight to determine the hitch weight.

While you are at the scale, you should 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. This is the best way to check that a weight distribution (or load leveling) hitch is adjusted properly, i.e., you have the proper number of chain links attached to the snap-up brackets.

## **5 CHECKING THE TRAILER BEFORE AND DURING EACH TOW**

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

Before towing, double-check all of these items:

- Inspect tires for wear, cuts, bulges and tread depth.
- Wheel lugs tightened to proper torque.
- Inflate tires on trailer and tow vehicle to the pressure stated on the vehicle Certification / VIN label or on the tire sidewall.
- Coupler secured and locked. See "Coupling To The Tow Vehicle" section of this manual.
- Safety chains properly rigged to tow vehicle, not to hitch or ball. See " Coupling to the Tow Vehicle" section of this manual.
- Test Tail, Stop, and Turn Lights.
- Test trailer brakes and breakaway brakes.
- Safety breakaway switch lanyard fastened to tow vehicle, not to safety chains. See " Coupling to the Tow Vehicle" section of this manual)
- Cargo properly loaded, balanced and tied down. See the appropriate "Loading the Trailer" section of this manual.
- Tongue weight and weight distribution set-up.
- Ramps secured in the transport position.
- Fire extinguisher in tow vehicle.
- Flares and reflectors in tow vehicle.

### **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

## BREAKING-IN A NEW TRAILER

### 6.1 RETIGHTEN 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 and Maintenance section.

#### WARNING

Lug nuts are prone to loosen after being first assembled. Death or serious injury can result.

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

### 6.2 ADJUST BRAKE SHOES AT FIRST 200 MILES

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

trailer brakes. Read your axle and brake manual to see if your brakes adjust automatically.

If your trailer is not fitted with automatically adjusting brakes, the brakes will need to be manually adjusted. See your axle manual for instructions.

### 6.3 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, death or serious injury can occur.

Road test the brakes in a safe area at no more than 30 m.p.h. before each tow.

To insure safe brake performance and synchronization, read and follow the axle/brake and the brake controller manufacturers' instructions.

# INSPECTION, SERVICE & MAINTENANCE

## 7.1 INSPECTION, SERVICE & MAINTENANCE SUMMARY CHARTS

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

Inspection and Service before Each Use		
Item	Inspection / Service	Manual Section Reference
Breakaway Brakes	Check operation	Sections 4.3.4 & 7.2.3.3
Breakaway Battery	Fully charged, connections clean	Sections 4.3.4 & 7.2.3.3
Brakes	Check operation	Section 4.3.4
Shoes and Drums	Adjust	Section 7.2.3.1
Coupler and Hitch Ball	Check for cracks, pits, and flats. Replace w/ball & coupler having trailer GVW Rating. Grease. Check locking device & replace when worn.	Section 4.3.1.1  Section 4.3.1.1 & 7.2.4 Section 4.3.1.2 & 7.2.4
Safety Chains & Hooks	Check for wear and damage	Sections 4.3.3
Tires	Check tire pressure when cold. Inflate as needed. Inspect	Sections 2.2.8 & 7.2.6  Section 2.2.8
Wheels - Lug Nuts (Bolts) & Hub	Check for tightness Tighten. For new and remounted wheels, check torque after first 10, 25 & 50 miles of driving and after any impact	Sections 2.2.8 & 7.2.9

Inspection and Service each 6 Months or 6,000 Miles		
Item	Inspection / Service	Manual Section Reference
Tires	Inspect tread and sidewalls thoroughly. Replace tire when treads are worn, when sidewall has a bulge, or sidewall is worn	Section 2.2.8 & 7.2.6
Brakes, electric		
> Magnets	Check wear and current draw	Section 7.2.3.5
> Controller (in tow vehicle)	Check power output (amperage) and modulation	Section 7.2.3.4 See Controller Mfr's Manual

## Inspection, Service & Maintenance

Inspection and Service Each Year or 12,000 Miles		
Item	Inspection / Service	Manual Section Reference
Brakes	Inspect by dealer.	Section 7.2.3.1
Structure	Inspect all frame members, bolts & rivets. Repair or replace damaged, worn or broken parts.	Section 7.2.1
> Frame members		
> Welds	Inspect all welds. Repair as needed	Section 7.2.2.2
Wheels		
> Wheel Bearings	Disassemble / inspect / assemble and repack. Replace promptly if immersed in water	Section 7.2.8 & See Axle Mfr's Manual
> Rims	Inspect for cracks & dents. Replace as needed.	Section 7.2.7
Structure		
> Axle Attachment Bolts	Check BY DEALER	Section 7.2.1

### 7.2 INSPECTION AND SERVICE INSTRUCTIONS

#### 7.2.1 AXLE BOLTS, FRAME, SUSPENSION, & STRUCTURE

**⚠ WARNING**

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

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

To perform many of the inspection and maintenance activities, you must raise the trailer. When raising and using jack stands, place them so as to clear wiring, brake lines, and suspension parts. Place jacks and jack stands under the main frame rail to which the axles are attached.

**⚠ WARNING**

**Never go under your trailer unless it is on firm and level ground, and resting on properly rated, placed and secured jack stands.**

#### 7.2.2 TRAILER STRUCTURE

Using a power washer and a detergent solution, wash the trailer to remove any dirt, road debris and road de-icer.

##### 7.2.2.1 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.

**⚠ WARNING**

**Broken or damaged fasteners or welds can cause injury or damage to trailer and contents.**

**Inspect for, and repair all damaged parts at least once a year.**

##### 7.2.2.2 Welds

All welds can crack or fail when subjected to heavy loads 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 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**

**Broken or damaged fasteners or welds can cause injury or damage to trailer and contents.**

**Inspect for, and repair all damaged parts at least once a year.**

#### 7.2.3 TRAILER BRAKES - ELECTRIC

##### 7.2.3.1 Brake Shoes and Drums

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 12,000 miles.

The brake shoes must be adjusted after the first 200 miles of use, and each 3,000 miles thereafter. Some axles are fitted with a brake mechanism that will

## Inspection, Service & Maintenance

automatically adjust the brakes. Refer to your axle and brake manual to see how to adjust your brakes.

### 7.2.3.2 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.

### 7.2.2.3 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.

**Breakaway Switch** - This switch causes the breakaway battery to operate the electric brakes if the trailer uncouples from the tow vehicle.

The lanyard for the pull pin is connected to the tow vehicle, and the switch is connected to the trailer. 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 trailer is uncoupled from the tow vehicle, death or serious injury can occur.

Check emergency breakaway brake system BEFORE each tow.

### 7.2.3.4 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.

### 7.2.3.5 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 12,000 miles. See the brake manual for wear and current inspection instructions.

### 7.2.4 TRAILER CONNECTION TO TOW VEHICLE

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.

### 7.2.5 LIGHTS AND SIGNALS

Before each tow, check the trailer taillights, stoplights, turn signals and any clearance lights for proper operation.

### WARNING

To avoid collisions, taillights, stoplights and turn signals must work.

### 7.2.6 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 under-inflated tires can cause loss of control, injury and damage.**

**Check tires before each tow.**

**7.2.7 WHEEL RIMS**

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.

**7.2.8 WHEEL BEARINGS**

A loose, worn or damaged wheel bearing is the most common cause of brakes that grab.

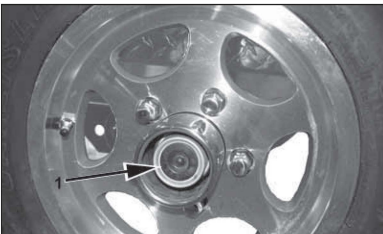
To check your bearings, jack trailer and check wheels for side-to-side looseness. If the wheels are loose, or spin with a wobble, the bearings must be serviced or replaced.

Refer to the axle manufacturer's information for service and maintenance on the axle.

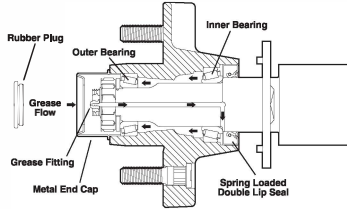
**7.2.8.1 Grease Lubricated Bearings**

Bearings should be lubricated every 12 months or 12,000 miles, whichever occurs first. Refer to your axle manual for the grease specifications.

- Remove the rubber plug (1) from the hub end.
- Place a standard grease gun nozzle onto the grease fitting. Make sure the grease gun nozzle is fully seated on the fitting.
- Pump grease into the fitting while rotating hub. The old displaced grease will begin to flow back out to the cap around the grease gun nozzle.
- Stop when new grease is observed.
- Wipe off excess and install rubber plug. See figure 8-1.



*Grease Fitting Lubricated Bearings - Figure 8-1*



*Grease Fitting Lubricated Bearings - Figure 8-2*

**7.2.9 LUG NUTS**

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.

**WARNING**

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

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

**WARNING**

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

**Death or injury can occur if wheel comes off.**

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

Tighten the lug nuts to the proper torque for the axle size on your trailer, to prevent wheels from coming loose. Use a calibrated torque wrench to tighten the fasteners. Verify that wheel studs are free of contaminants such as paint or grease, which may result in inaccurate torque readings. Over-tightening will 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 the sequence shown in figure 8-3.

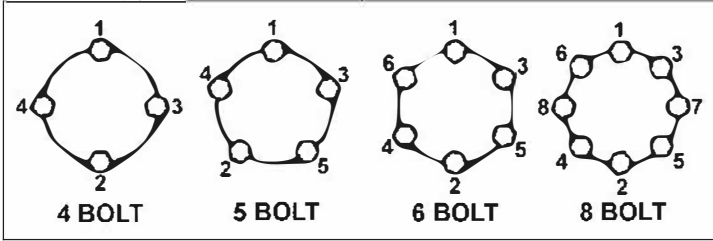
Refer to your axle manual or figure 8-4 for the proper lug torque.



## Inspection, Service & Maintenance

Do not install aluminum wheels, aftermarket wheels or aftermarket wheel lugs on your trailer. Use only original equipment wheels and wheel lugs. Aluminum wheels, aftermarket wheels and aftermarket wheel lugs may not meet the load carrying requirements, pressure capacity and offset as the original equipment.

Use a calibrated torque wrench to tighten the wheel lugs to the proper torque for the axle size on your trailer.



*Lug Nut Torque Sequence - Figure 8-3*

Stud Size	1 <sup>st</sup> Stage Torque	2nd Stage Torque	3rd Stage Torque
1/2 Inch	35 lb-ft	65 lb-ft	100 lb-ft
9/16 Inch	45 lb-ft	90 lb-ft	130 lb-ft
5/8 Inch	70 lb-ft	140 lb-ft	200 lb-ft

*Lug Nut Torque Sequence - Figure 8-4*