

YOUR GUIDE TO TOWING

LOOK INSIDE FOR:

- ▼ Tips for better towing
- ▼ Step-by-step safety checklist

PLUS:

- ▼ Road rules in all 50 states



Produced by
Trailer Boats magazine
in conjunction with

Sea Ray

Contents

Your Guide to Towing

If you love to fish, waterski, cruise, camp, hike or just get outside and enjoy some clean, fresh air, a trailerable boat or camping trailer can be a great way to satisfy that craving.

You can take a trailer almost anywhere — to the river, a high mountain lake or campground, or to the beach — and unlike dock-bound boats or vacation cabins, you can bring it all back with you to keep it safe, secure and conveniently stored at home.

Yet, towing a trailer seems like an overwhelming challenge to some. Meeting those challenges, making informed decisions and taking knowledgeable actions will help you to maximize the enjoyment of your trailer boat or camping trailer. Assisting you in discovering how to do this safely, securely and self-assuredly is what *Your Guide to Towing* is all about.

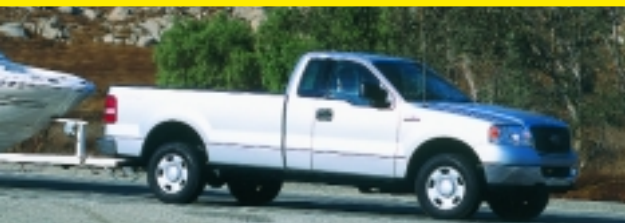
Produced by the editors of *Trailer Boats*, *Camping Life* and *Bass&Walleye Boats* magazines, this booklet serves as a step-by-step tutorial for newcomers and a refresher course for trailer-towing veterans.

If, after reading this informative booklet, you still have questions, we invite you to write to the companies listed in the Towing Resources Index on the last page of the booklet. You can also write the editors of *Trailer Boats*, *Camping Life* and *Bass & Walleye Boats* using the contact information on page 48.

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Tow Vehicles

How to Choose Your Tow Vehicle

Whether you're an old pro or a novice, towing can be tricky. The first step in any case is to have the right equipment, and that begins with having the appropriate tow vehicle. However, there's one thing to keep in mind when choosing a tow vehicle: You first need to know how much your towed load (boat or travel trailer) really weighs.

In the case of a boat, that towed weight includes the trailer. It comes as a surprise to many would-be buyers that manufacturers generally furnish "dry" or empty weights (without op-

tions) for boats or camping trailers. Camping trailers with the Recreational Vehicle Industry Association (RVIA) seal should have a label that provides unloaded vehicle weight (UVW) with factory-installed options. Boat catalogs often list the dry weight of the hull, but not the weight of the engine or the weight of the boat's trailer. And although some furnished weights are quite accurate, these figures should only be used as guidelines.

For example, a boat weight may only include the hull. To that, you may have to add engine

weight, accessories, all the extra equipment stored in the boat and, if towing with a full load of fuel or water, figure about 6.1 pounds per gallon of gasoline and about 8.3 pounds per gallon of water. Diesel weighs about 7.1 pounds per gallon, and LPG (propane) weighs about 4.5 pounds per gallon. Depending on boat size, trailers can weigh anywhere from a few hundred pounds to more than 2000 pounds. So it's not unusual for that 4000-pound boat to grow by 1500 to 2000 pounds when it's ready to tow.

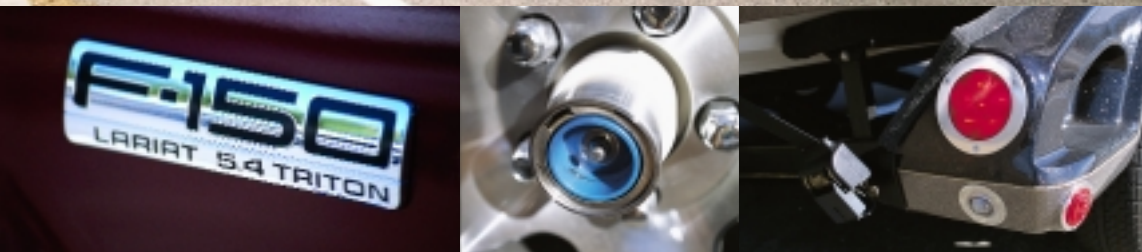
The most accurate way to determine your towed load is to weigh the boat/trailer or camping trailer as it is outfitted and loaded when it's ready to tow. It only costs a few dollars at a public scale, and it can save thousands of dollars in unexpected repairs to an ill-equipped tow vehicle.

BUYING A TOW VEHICLE

As a rule, if you want to tow a heavy load, you need a full-size pickup or sport-utility vehicle (SUV). If you have or plan to buy a small tow vehicle, such as a compact pickup or SUV, you will have to stick with a smaller, lighter boat or camping trailer.

Every vehicle has a tow rating. A full-size truck's tow rating can be as high as 10,000 pounds or more. The best place to find this information is in the vehicle owner's manual. Some automotive manufacturers offer towing guides that include tow ratings and detailed information on extra equipment needed to tow heavier loads. They are available from dealers, manufacturers' information offices and also can be called up on the Internet.

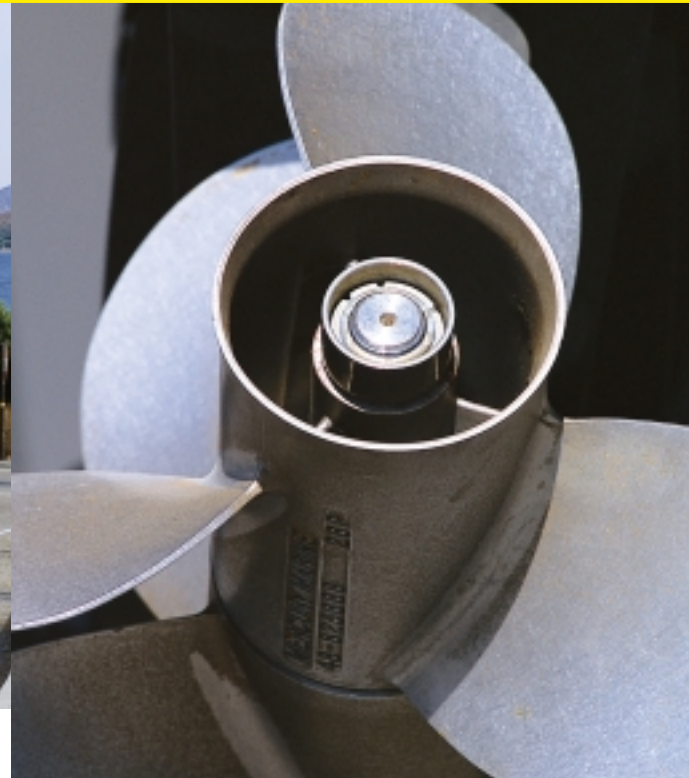
Most cars today have negligible tow ratings. Modern automobiles have severe limitations, and



TOW RATINGS OF 4WD TRUCK MODELS are often lower than those of 2WD models. However, the advantage of purchasing a tow vehicle with 4WD capability, despite the slightly lower tow rating, is the ability to easily pull the trailer boat up a steep or slippery boat ramp.



BOAT CATALOGS OFTEN LIST the dry weight of the hull, but not the weight of the engine or the boat's trailer. It is best to weigh your entire trailer/boat package prior to a tow vehicle purchase.



fewer than a handful are rated to tow more than 2000 pounds. Those limitations exist because of car-body structures and powertrain (engine, transmission, axle) components. If you overextend a modern car not rated to tow a heavy load, the consequences can be costly repairs and diminished highway safety. For towing loads over 2000 pounds, the only real option for those who need to tow with a car are older automobiles properly equipped for towing (see Chapter 2/Towing Equipment).

In recent years, trucks (pickups, SUVs and vans) have become very popular. With the demise of automobiles as tow vehicles, trucks have more than taken up the slack with roomy, comfortable, four-door models. Most modern trucks have the structural integrity necessary to easily handle heavy loads — as long as that load is within the manufacturer's towing recommendations.

The larger the truck, the sturdier the construction, the stronger the suspension, and the larger the engine will be. This makes them superior to modern automobiles for towing. In addition, most have a separate, full frame that provides a secure mounting location for the hitch.

TOW RATINGS

Deciphering tow ratings can be confusing, unless you read the fine print. For example, a maximum tow or "trailer weight" rating may be for an unloaded vehicle with only the driver aboard, a full fuel tank, oil and water, but not with passengers or optional equipment, such as air conditioning. It's not unusual to add 500 pounds of options to some vehicles, another 500 pounds for passengers and still another 500 pounds for luggage and other boating/camping gear. That can effectively lower the actual tow rating by 1500 pounds — and you must take this into account when choosing a tow vehicle.

Tow rating charts often include three "categories" that deal with weight. These are Gross Vehicle Weight Rating (GVWR), Trailer Weight Allowance (TWA), commonly stated as "maximum trailer rating," and Gross Combined Weight Rating (GCWR).

The GVWR is the maximum permissible weight a fully loaded vehicle may weigh. That number can be found on a label inside the driver's-side door.

TWA is the maximum weight a vehicle can tow. Be aware that this figure can vary depending

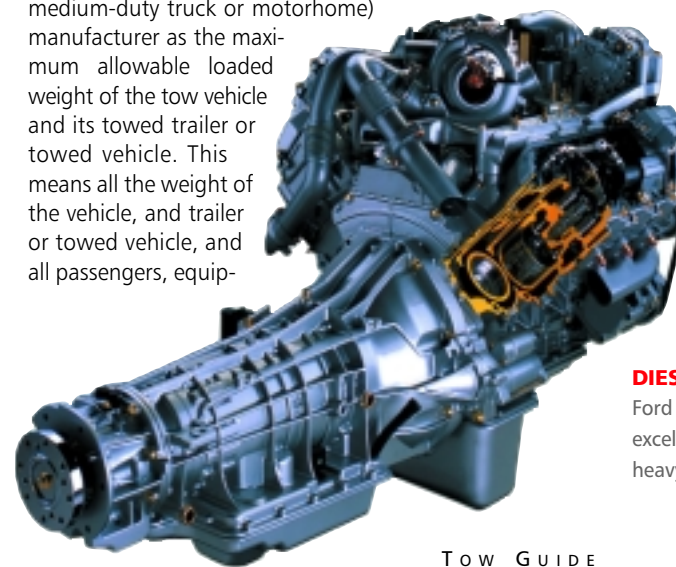
on whether the vehicle is equipped with a manual or automatic transmission and if it is equipped with four-wheel drive (4WD).

The GCWR is a type of tow rating, and perhaps the most important of all. The GCWR is the total weight specified by the tow vehicle (light truck, medium-duty truck or motorhome) manufacturer as the maximum allowable loaded weight of the tow vehicle and its towed trailer or towed vehicle. This means all the weight of the vehicle, and trailer or towed vehicle, and all passengers, equip-

ment and fuel carried in both. The best way to make sure your rig does not exceed these ratings is to take the vehicle and trailer to a public scale, fully equipped (or add the weight of extras later), and get them weighed accurately.

In addition, almost all vehicle and chassis manufacturers recommend that a supplemental brake control system be installed to activate the brakes on the trailer being towed. Vehicle owners should also consult individual state laws concerning this subject, as well as other trailering requirements.

There are also a host of accessories that automakers may



DIESEL ENGINES, SUCH AS THE Ford 6.0L Power Stroke pictured, are excellent powerplants for towing heavy loads.



require for tow vehicles, especially trucks. These often include a heavy-duty radiator, engine-oil cooler, transmission-oil cooler, wiring harness, specific axle ratio, heavy-duty suspension, and special wheels and tires. These accessories would be expensive if bought separately. However, most manufacturers offer “trailer packages” that include these items. Packages often include a hitch (drawbar and hitchball not included). These factory-installed tow packages are considerably cheaper than if you add them later.

Don’t shortchange yourself by skimping on required items. Each required accessory adds to the vehicle’s towing capability and durability.

KNOW BEFORE YOU BUY

One of the most frequent comments from new vehicle owners is: “I was told by the dealer that my vehicle could tow 5000 pounds, but it does that poorly and sometimes even overheats.” They go on to say that various expensive items were added, but performance is still unsatisfactory.

A prospective buyer may have been given the maximum tow rating for a vehicle with the towing package, but was sold one without that package. Without a towing package, that same vehicle may be rated to tow only 2000 pounds.

Carefully read the window sticker that is posted on the vehicle at the dealership. It will tell you precisely what equipment is on that vehicle. Be aware, too, that there may be more than one towing package offered by a manufacturer. One may be for light-duty towing (often 3500 pounds maximum), while the other is for heavy-duty towing.

2WD OR 4WD?

Until recently, drivers have had only two drive-system choices for their tow vehicles: Two-wheel drive and four-wheel drive.

Two-wheel drive (2WD) means that either the front or rear wheels are the driving wheels. When on a steep launch ramp or very steep incline, the front of the vehicle usually lifts, causing the front tires to have less traction than the rear. When this happens with a front-drive vehicle, it will facilitate wheel spin and can limit the driver’s ability to retrieve the boat.

However, vehicles with a 4WD system can be especially useful on a steep or slippery launch ramp, because the front wheels can help pull it



IF YOU TOW A HEAVY LOAD, you will need a full-size pickup (opposite page) or sport-utility vehicle. A full-size pickup’s conventional tow rating can be as high as 12,000 pounds.

Towing Equipment

How To Equip Your Vehicle for Towing

Most vehicles require additional equipment for towing. The equipment package often includes various cooling systems, heavy-duty suspension components, the appropriate axle (ring and pinion) gear ratio and usually a more powerful engine. However, some towing packages do not include a hitch or wiring, so you'll need to get that on your own. The purpose of this extra equipment is to increase the longevity of your tow vehicle and improve its trailering performance.

A tow vehicle's greatest enemy is heat. It affects everything that moves. Controlling that heat usually isn't a problem during normal driving, as long as the vehicle is used within its prescribed limits. But, when you make it work hard, such as when towing, heat will build up more rapidly. Your major concerns must be keeping engine coolant, engine oil and transmission oil temperatures at proper levels.

ENGINE COOLING

All engine radiators work on the same principle. As liquid coolant circulates from the engine block and through the radiator, heat is dissipated from the radiator to the surrounding air. Consequently, the greater the cooling surface area and/or the more air that passes over that surface, the faster the heat is drawn from the coolant.

The harder an engine works, the more heat it generates. That's why manufacturers offer optional heavy-duty cooling systems and/or include them in towing packages. A heavy-duty cooling system generally has a radiator with one or more additional cores for greater cooling capacity. A core is a layer of cooling fins and tubes through which the hot water passes.

Included in many heavy-duty cooling systems is a more powerful fan that increases airflow



and the boat up. A special benefit of 4WD is that it has a "low range" — a lower gear range that increases the torque delivered to the wheels for more power to pull a heavy boat up a steep, wet ramp.

Tow ratings for 4WD systems are usually lower than they are for 2WDs, because they add weight to the vehicle, and the extra weight detracts from the GCWR.

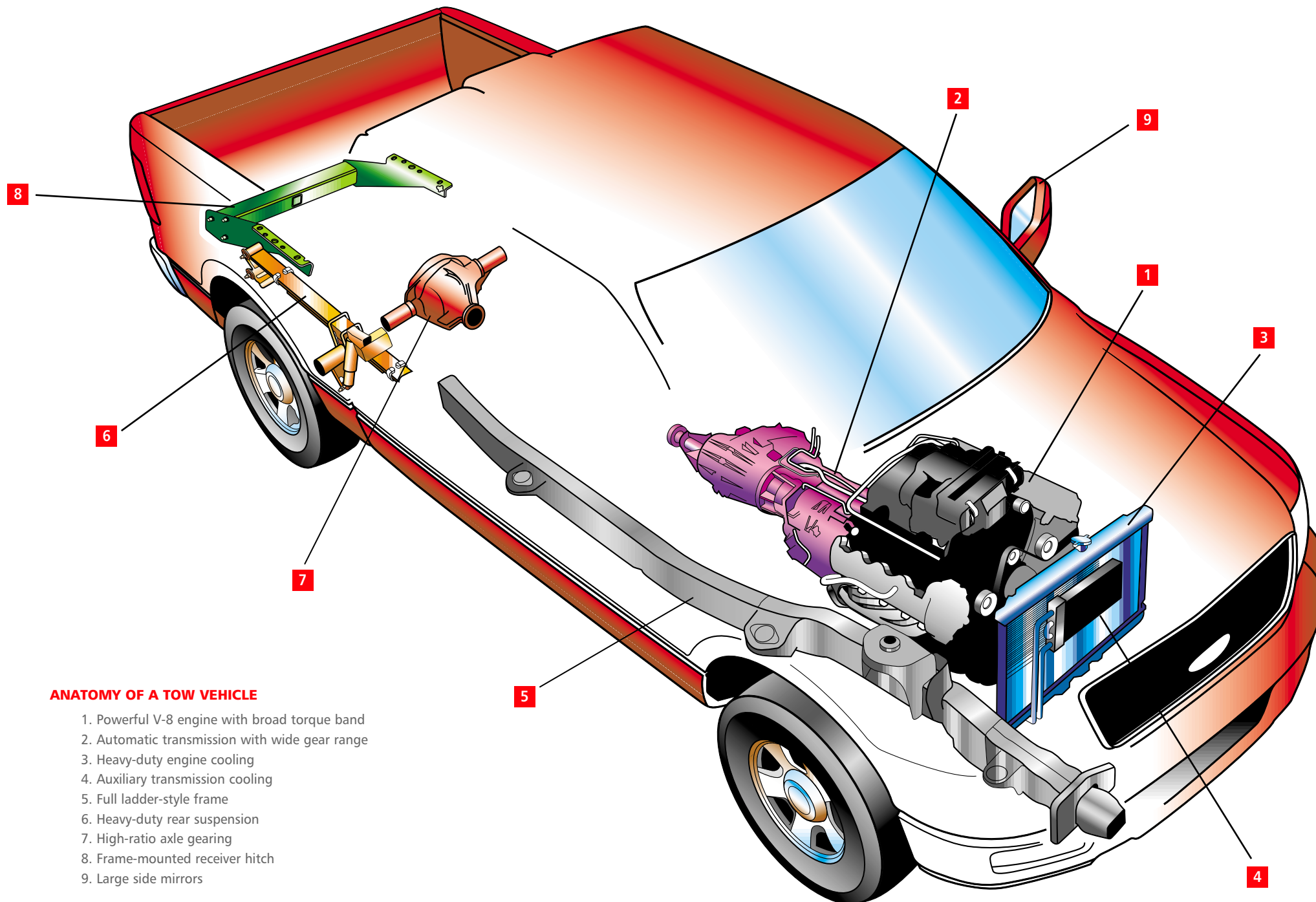
All-wheel drive (AWD) systems also make all four wheels turn at the same time, but through a different system than 4WD — usually a computer-controlled viscous coupling. This is a tremendous safety advantage for all kinds of

driving, especially on wet or slick surfaces. With all wheels driving, the vehicle is also more stable and controlled on winding, curving roads. However, AWD also adds weight to the vehicle and can reduce the trailer tow rating.

On the plus side, modern AWD systems go into action in a matter of milliseconds with computer control. It continues to adjust for wheel spin at any or all wheels just as quickly. It's an excellent feature on slick launch ramps.

Understanding exactly what your tow vehicle is equipped with and how much weight it can actually tow is the key to being happy with your tow vehicle choice.





ANATOMY OF A TOW VEHICLE

1. Powerful V-8 engine with broad torque band
2. Automatic transmission with wide gear range
3. Heavy-duty engine cooling
4. Auxiliary transmission cooling
5. Full ladder-style frame
6. Heavy-duty rear suspension
7. High-ratio axle gearing
8. Frame-mounted receiver hitch
9. Large side mirrors

through the radiator. Quite often, a heavy-duty fan is thermostatically controlled, so it operates only when coolant temperature becomes too high.

ENGINE OIL COOLER

Engine oil can also reach unusually high temperatures when towing, especially in engines that have smaller oil capacities. Many auto manufacturers require the use of oil coolers for towing. Oil coolers are routed from the engine oil filter to an auxiliary radiator. Adding an aftermarket deep-sump oil pan will increase oil capacity, which can also help cooling.

By keeping oil temperature down, you lower overall engine temperature. This is especially important when towing in the mountains or in high-heat desert conditions.

TRANSMISSION COOLER

The most overlooked cooling device is the automatic transmission fluid cooler. The premature failure of an automatic transmission is almost always due to overheating, and this usually occurs when towing.

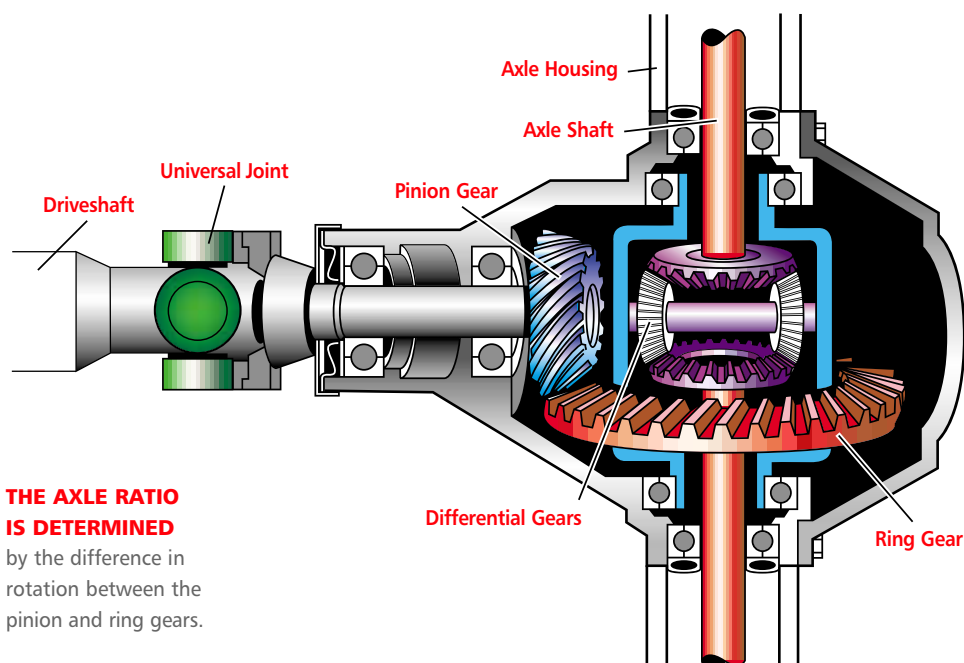
Automatic transmissions generate heat whenever the vehicle is moving. The harder the powertrain works, the more heat is generated inside the transmission. Without some way of cooling the transmission fluid, heat will continue to build.

Normal automatic transmission fluid (ATF) temperatures are 170 degrees F. Once those temperatures exceed 200 degrees, the ATF begins to break down rapidly as heat increases.

Many of today's vehicles already have transmission coolers built into the radiator. But these are for normal use only. For towing, most manufacturers recommend auxiliary coolers. An auxiliary cooler has a separate radiator that is normally mounted in front of the coolant radiator. Deep sump pans, like those used for engine oil, are also available for transmissions and add more fluid volume, which can help control temperatures in the transmission.

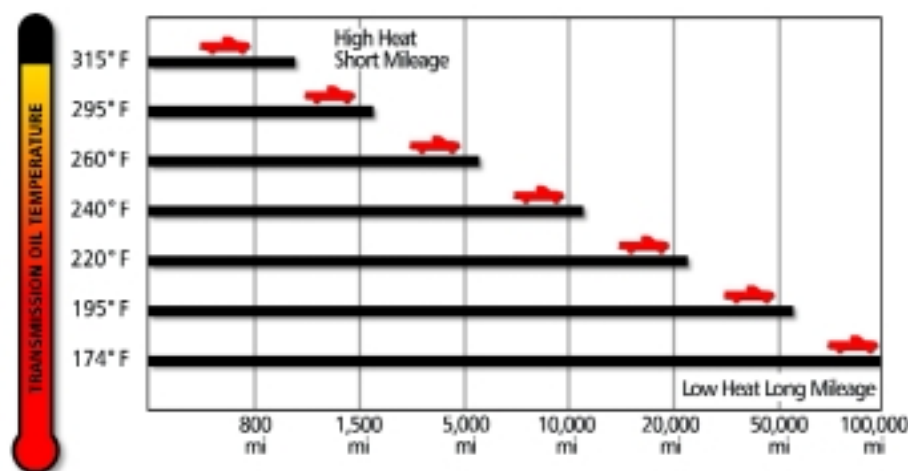
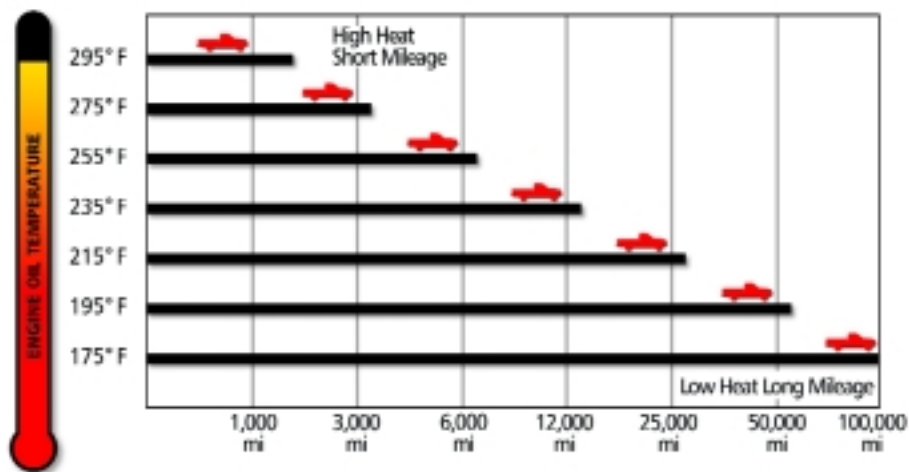
AXLE RATIO

The proper axle (ring and pinion) gear ratio keeps the engine operating at a sufficient speed to best use its available power. Up to a point, an engine turning higher rpm when towing will run cooler,



THE AXLE RATIO IS DETERMINED

by the difference in rotation between the pinion and ring gears.



TEMPERATURE REGULATION IS one of the most important strategies for extending powertrain component life in your tow vehicle.

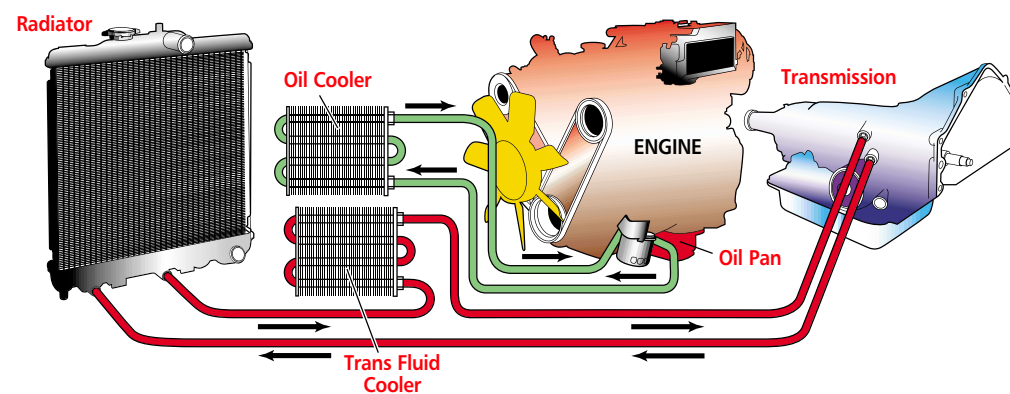
give better performance and better fuel economy than an engine that is laboring (running too slow). Axle ratio also affects acceleration and tow ratings.

For light, non-towing loads, the vehicle can use an axle ratio that has low numbers, such as a 2:1 ratio. When subjected to heavy loads, high numbers are preferred, such as 4:1. The axle ratio is determined by two gears in the differential: pinion and ring gears.

The pinion gear transfers power from the transmission to the larger ring gear, which is located in the differential and drives the axles. A ratio of 2:1 indicates that the smaller pinion gear must rotate two times for each revolution of the ring gear. A ratio of 4:1 means the pinion turns four times to each ring-gear revolution.

Each axle ratio has its own advantages and disadvantages. A low axle ratio can offer better

AUXILIARY OIL AND TRANSMISSION fluid coolers are key elements in reducing high operating temperatures in tow vehicles.



fuel economy, quieter operation, higher top speeds and longer engine life. A high axle ratio (4.10:1, for example) can increase pulling power and give better acceleration. When towing, however, if an axle ratio is too low, the engine cannot operate at optimum rpm while maintaining speed, accelerating or climbing hills; thus it overheats. Generally, good axle ratios for towing are between 3.50:1 and 4.10:1.

On new vehicles sitting on the dealer's lot, the axle ratio will be listed on the window sticker. If you don't know your present vehicle's axle ratio, there are several ways to find out what it is. Some manufacturers stamp it into the differential or transaxle housing, or on a metal tag attached to the differential cover. More commonly, it is in code and part of the Vehicle Identification Number (VIN) or some other identification number, such



AFTERMARKET OIL AND TRANSMISSION fluid coolers are available in different sizes for a variety of tow-vehicle applications.



AIR SPRINGS (bags) are one way to improve a tow vehicle's rear suspension. They are easy to install and can be adjusted for different loads.

as on a sticker or card pasted inside the glove compartment or doorjamb. It's best to check with a dealer as to where you can locate and how to decode a number that refers to the axle ratio.

SUSPENSIONS

A vehicle's suspension not only helps the driver maintain control and provide for passenger comfort, but it can affect the trailering performance. Too soft a ride when towing can make the vehicle's rear end sag, bounce and even sway. This is why factory supplied towing packages include heavier-duty suspensions.

Usually, springs with higher spring rates (stiffer), heavy-duty shocks and larger diameter anti-sway bars are included in these factory towing packages. Often, though, even factory towing packages may need to be supplemented with additional equipment such as aftermarket air spring (bag) systems, performance shock absorbers and

anti-sway bars — particularly if your towed load is large and heavy.

ADDITIONAL MAINTENANCE

Towing places extra stress on any tow vehicle. You need to pay closer attention to routine maintenance than normal. Manufacturers have a separate maintenance recommendation for heavy-duty use, such as towing, which is outlined in the owner's manual.

Most importantly, you need to change engine and transmission oils and filters more frequently, and lubricate components and check cooling systems at shorter intervals than you would on a vehicle used strictly for passenger duty.

If you have the appropriate equipment on your tow vehicle, and are prudent when it comes to an accelerated maintenance schedule, it should offer you many happy, carefree trailering miles.

Leveling, Loading and Driving

How to Set Up and Drive with a Trailer Behind Your Tow Vehicle



A trailer tows best when level, so do your level best to get it that way when attached to your tow vehicle by adjusting the hitch ball height. This can be done using a dropped or raised drawbar, or with an adjustable hitch.

Weight distribution can affect trailer handling, too. Make sure the trailer is properly loaded — front to rear, and side to side. Because most of a boat's weight is over the axles, it will generally be properly balanced when empty. Due to the engine, however, a small boat is often heavier at the rear. In this case, gear is usually packed in the forward section to offset the heavy weight at the stern. If the loaded boat is not properly balanced on the trailer, the bow stop and axles can be moved fore or aft to alter tongue weight.

For camping trailers, it is usually recommended to add cargo to the front to increase tongue weight. Bicycle racks and other gear storage appliances can lead to trailer sway if not mounted properly, especially with lightweight trailers that are more susceptible to changes in weight distribution. With bike racks or storage boxes mounted at the rear, the tongue weight of the trailer is lightened. Again, be aware of the total weight you are adding to the trailer.

SWAY CONTROL

Camping trailers — and some large boat trailers — often use sway controls. These usually mount to the drawbar near the hitchball and reach to a point on the trailer tongue. A damping device (such as a shock absorber or friction pad) is used to control side-to-side movement and help keep sway in check.

Passing trucks, gusting crosswinds, steep downhill grades, and excessive speed can cause sway. Slow down before approaching downhill sections and areas of gusty wind. To reduce the tendency of a trailer to sway, keep tongue weight between 10 to 15 percent of the total towed weight for camping trailers; boat trailer tongue weights of 5 to 8 percent are recommended. Keep the tow vehicle's tires and trailer tires inflated to the maximum cold pressure stamped on

their sidewalls. On larger trailers, it's a good idea to install a sway control device.

If your trailer starts to sway, SLOW DOWN, but don't stomp on the brake pedal. Turn the steering wheel as little as possible while maintaining control of the vehicle. Because of your natural reaction time lag, counter-steering can actually increase sway. If the trailer has electric brakes, use the hand control to apply them; this will help keep the vehicles aligned. Stop as soon as possible and check tire pressure, sway control and spring bar adjustments, and look for cargo weight shifts or mechanical failures.

Until the problem has been corrected, keep your speed down to maintain full control. Keep in mind that one of the greatest factors involved in the inducement of trailer sway, other than incorrect weight distribution, is excessive speed.

TOW VEHICLE LOADING

The load carried inside a tow vehicle is an integral part of the vehicle's tow rating. Two critical figures you should be aware of are front and rear

Gross Axle Weight Ratings (GAWR). These figures tell you how the vehicle is designed to handle a load. In light-duty vehicles, the rear GAWR may be less, which means you can only carry a limited amount of weight back there. Overloading the rear axle with gear and/or passengers can affect towing stability and safety.

The more crucial figure is the Gross Vehicle Weight Rating (GVWR). If you add up the two GAWR figures, you'll find that they exceed the GVWR. The reason for this is to give you the flexibility of where to stow extra weight. However, never exceed the GVWR. These weight figures can be found on a placard on the edge of the driver's door.

TIRES AND WHEELS

People often forget to check tow vehicle tire and trailer tire pressures. These should be considered your lifelines to the road. Tire failure is the cause of most towing accidents. Under-inflation is the prime cause of trailer-tire failure because the excessive sidewall flexing creates overheating that can lead to blowouts. It is recommended you maintain proper cold tire pressure on trailer tires, as indicated on the tire sidewalls or the trailer manufacturer's certification label. Always check

CHECK ALL LUG NUTS prior to every trip you take with your trailer boat or camping trailer.



SAFETY CHAINS SHOULD BE as tightly strung as possible, without hindering the trailer's turning ability, and crossed to act as a cradle to catch and keep the trailer's tongue from hitting the ground if it comes loose from the hitch ball.



TIE-DOWN STRAPS SHOULD BE used on the bow and stern to make sure the boat stays securely settled on the trailer during travel.

air pressure when tires are cold, before moving the trailer. Tires heat up and air pressure increases after traveling only a short distance.

Wheel nuts must be tightened to a specific torque rating so they won't rattle loose. Too loose or too tight can be a bad thing; they must be just right. This is best done with a torque wrench, not the air-impact wrench your tire shop probably used. Your automobile owner's manual or the wheel manufacturer (in the case of custom wheels) should be able to furnish the proper tightening settings and procedures. And always retighten the nuts after the first 25 miles. Tandem axles on trailers do not steer, so their wheels tend to flex and loosen more than single-axle trailers. Check and retighten them frequently.

READING THE LABELS

Now, let's look at the fine print on the trailer's labels. First, federal law requires trailer and tire registration information. So fill out any forms you get from the dealer and mail them to the appropriate source. This makes it possible for the manufacturers of the various products — tires, axles, coupler and so forth — to issue a defect notification, if applicable. It is insurance for you so you'll know about a possible problem in time to have it corrected.

Now, check the metal or plastic certification label attached by the manufacturer to the left forward side of the trailer. It will show the maximum permissible loaded weight of the trailer. Known as the Gross Vehicle Weight Rating (GVWR), it is the load-carrying capacity plus the empty weight of the trailer. This total weight includes all options, gear and fluids in the trailer. Remember that fluids add weight.

Many camping trailers have 30-gallon water tanks and 6-gallon hot-water tanks. Water weighs 8.3 pounds per gallon. And don't forget the weight of the filled propane bottle(s), and all the gear, luggage and other cargo you've loaded into the trailer. Do not exceed the GVWR! If you do, you stand a good chance of breaking something. If you don't know how much it weighs, take it to a public scale and find out.

LAWS, SAFETY AND COMMON SENSE

Trailer laws covering such things as brakes, lights, safety chains and licenses vary from state to state. Be sure that your trailer is in full compliance with your state laws.

One of the most often overlooked trailering laws is that regarding safety chains. The purpose of safety chains, of course, is to keep the trailer from becoming detached from the tow vehicle while towing. Some



EXTENDED SIDE-VIEW MIRRORS are especially useful when towing large boats or camping trailers.

trailers come with only one chain, which is only partially beneficial. With two chains, you should cross them to form a cradle. Should the coupler come loose from the hitchball, it will drop into the cradle and not drag on the pavement, which gives the driver better control and usually minimizes potential damage.

Now that you know what can happen when the coupler comes loose, let's take a look at what needs to be done to prevent it. Most importantly, make sure the coupler matches the hitchball. The coupler will be stamped with the hitchball size it will mate with: 1 $\frac{1}{8}$ inches, 2 inches or 2 $\frac{3}{8}$ inches. If the hitchball is too small, the coupler will hop off when the trailer bounces up and down on uneven road surfaces. Most couplers either have a locking device that can be activated, or a hole into which you can insert a bolt to keep the coupler from popping open.

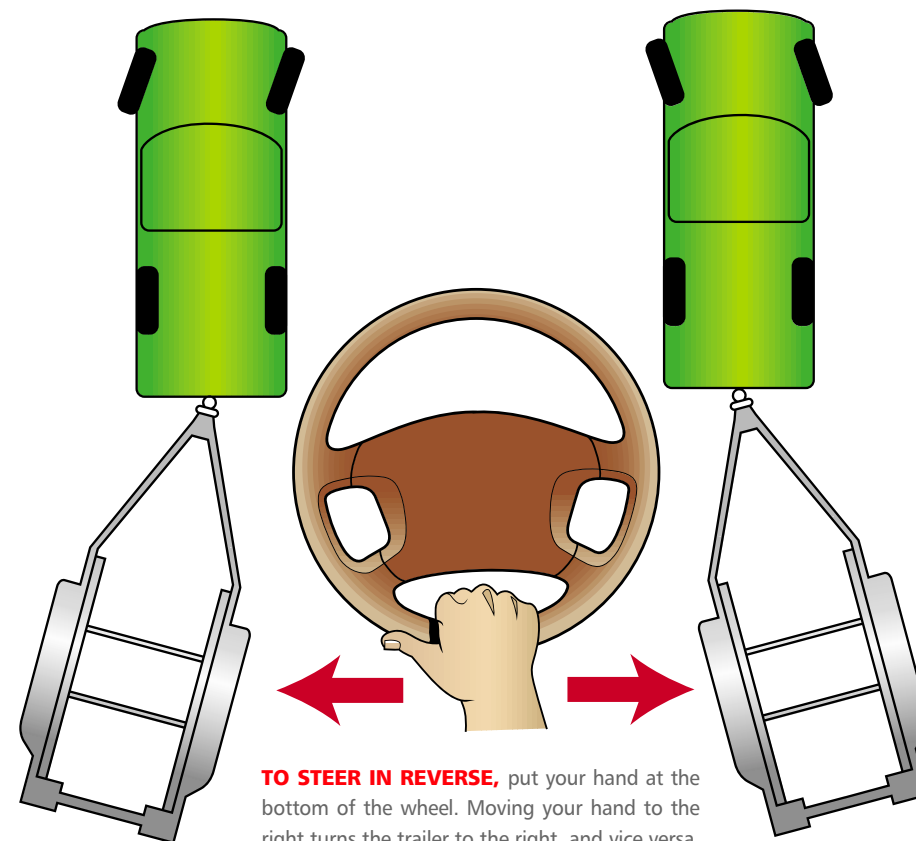
Additionally, don't forget to securely attach the breakaway trailer brake cable to the tow vehicle's hitch. Usually it can be hooked to the same steel

loop on the receiver hitch that the safety chains are hooked to. And always plug in your trailer's electrical harness to the receptacle on your tow vehicle. Then make sure all lights, including turn signals, brakes and backup (if your trailer has them) are operating correctly.

These topics — overloading your tow vehicle, tongue weight, sway control, and proper attachment of the trailer to the tow vehicle — are all things that should be carefully considered before setting out on any towing adventure.

DRIVING WITH A TRAILER

If you're unfamiliar with trailer towing, don't feel overwhelmed. With a little practice, it really isn't that difficult. In fact, with a properly set up trailer and tow vehicle, you'll hardly notice you are towing, until you get into tight spaces. Just keep in mind that you are now driving with a vehicle that's a lot longer and heavier than it was before.



TO STEER IN REVERSE, put your hand at the bottom of the wheel. Moving your hand to the right turns the trailer to the right, and vice versa.

You will notice reduced acceleration, longer stopping distances, lower fuel economy, some blind spots in your mirrors (especially with large trailers) and a much wider turning circle.

The wider turning circle becomes evident when rounding sharp corners. Your trailer will not turn in the same arc as the tow vehicle. You'll need to make a much wider swing to avoid curbs and road signs.

Also be aware of the extra length required when changing lanes or passing. Watch your mirrors closely to make sure there's enough room to move over, and always use your turn indicators. Courteous drivers will flash their headlights at you to indicate there is adequate clearance.

When it comes to stopping, remember to keep your distance. Look farther ahead than usual and anticipate your — and others' — actions. When towing, your stopping distance will increase dramatically. This is not the time to tailgate. Also be aware that after retrieving a boat

from the launch ramp, the trailer brakes will be wet, temporarily reducing their effectiveness.

SIDE MIRRORS

One of the first things you'll learn is that your main rearward vision will be from the side mirrors. On most vehicles designed to tow heavy loads, the standard side mirrors should be adequate until boat or trailer width exceeds 8 feet. Extended mirrors (available from boat or RV dealerships) will become a valuable accessory. Vertical mirrors are often the best choice since they offer a better view of the tow vehicle and trailer wheels. A convex "spot" mirror on the passenger side helps a lot, too.

BACKING UP

Driving a trailer in reverse can be challenging, even for the experienced. Our best advice is to plan ahead and limit the amount of backing you will have to do.



TIRES DESIGNED FOR USE ON trailers are designated with an “ST” sizing, and usually have sturdier side walls to help handle the heavier loads of boats and camping trailers.

Try to leave yourself plenty of room, and if you have to turn while backing up, back to your left (driver’s side). This way you’ll be better able to see the trailer’s movements. Also remember the trailer will go in the opposite direction of the tow vehicle when backing — this is often the hardest thing to get used to.

An easy way to help you through the learning process is by concentrating on the steering wheel. Try placing one hand at the bottom of the steering wheel. Watch your mirrors. Move s-l-o-w-l-y! If you want the trailer to move right, move your steering hand to the right. If you want the trailer to move left, move your hand to the left.

Some people are uncomfortable with this procedure. An alternative would be to turn so you can see through the rear window and watch what you are doing, but this can be awkward. Try both, and decide which is most comfortable for you.

Either way, your best friend is practice. A friendly spotter standing at the rear of your trailer helps tremendously. Empty parking lots with parking stripes are great for practicing. Always back slowly — the faster you go, the more difficult it becomes. The nice thing about a vacant parking lot is that you can concentrate on how to move the trailer without having to think about striking another object.

This is also a good time for driver and partner to

coordinate their hand signals. Working together as a team makes backing up a trailer much easier. This becomes important in tight situations such as campgrounds, or when launching and retrieving a boat. When you first work out signals, be sure you can see your assistant — otherwise, the person could be waving frantically only to find his signals ignored because you can’t see them.

One important tip to remember when backing: If the trailer heads in the wrong direction too abruptly, stop, pull ahead and try again. This is much easier than trying to correct your mistake, which leads to the zigzag pattern you see so often from novices.



GIVE YOURSELF PLENTY of braking room when towing, especially on downhill grades.



Trailer Wiring

How the Wiring on Your Trailer Should Work

To be highway legal, a trailer must have running lights (taillights and/or marker lights), turn signals and brake lights. Some trailers even have back-up lights. Of course, this means you must tap into the tow vehicle's electrical system.

CONNECTORS

Electrical power is transferred to most boat trailers — and some camping trailers — by using a four-way connector, or a five-way (for the back-up lockout circuit) if disc brakes are used. On the other hand, most camping trailers and travel trailers — along with some boat trailers — use seven-way plugs. Some very large travel trailers even use nine-way plugs.

In a seven-way plug, two wires control the turn signals and brake lights, a third operates the running lights, and a fourth is used for ground. The fifth wire operates backup lights, a sixth operates the electric brakes, and a seventh wire is used for auxiliary power — such as charging a trailer battery while towing.

Don't allow the trailer wiring or plug to dangle and scrape the ground. The most efficient and safest way to loom the wiring harness along the trailer's tongue is to install clips that hold it to the trailer's frame. These are available from hitch dealers.

Connectors get dirty and thus need occasional cleaning. With the flat plastic plug commonly found on boat trailers, a few in-and-out, twisting motions with the pronged part of the connector will free the open plug of dirt and corrosion. With a round connector, a contact cleaner will do the job — and while you're at it, clean the insides of your vehicle's plug receptacle, too.

If you plan to shorten the wiring for a better fit between tow vehicle and trailer, be sure to leave enough slack for tight turns. Otherwise, you'll disconnect or tear the wiring.

ELECTRIC BRAKE CONTROLLERS

While almost all boat trailers use hydraulic brakes with a surge actuator (some hybrid electric-over-



THIS FIVE-WAY PLUG USES a fifth circuit to lock out the trailer's disc brakes when you back up. An adapter may be needed to mate with the tow vehicle's plug.

COMMON WIRE COLORS & FUNCTIONS					
CONNECTOR TYPE	WIRE FUNCTION	WIRE COLOR	CONNECTOR TYPE	WIRE FUNCTION	WIRE COLOR
6-Way	Dual-Purpose Bulb System		7-Way	Dual-Purpose Bulb System	
	Right Turn & Brake Lights	Green		Right Turn & Brake Lights	Brown
	Left Turn & Brake Lights	Yellow		Left Turn & Brake Lights	Red
	Taillights & Clearance Lights	Brown		Taillights & Clearance Lights	Green
	Ground	White		Auxiliary (Center Pin)	Yellow
	Backup Lights	Red		Ground	White
	Electric Trailer Brakes	Blue		Electric Trailer Brakes	Blue
			Auxiliary Power/Battery Charge	Black	

THERE ARE FOUR MAJOR TYPES OF vehicle-to-trailer electrical connectors for recreational towing, including four-, five-, six- and seven-way plugs. The chart above outlines the functions for each of the color-coded wires.

hydraulic actuators have come on the scene recently, and at least one company is offering waterproof electric drum brake systems for boat trailers), the vast majority of camping trailers operate with electrically controlled brake systems.

For electric brake systems, you will need to install a brake controller. Many brands are available, but all work on the same basic principle. An amplified electric signal is sent to the trailer's brakes (via an electric brake controller) when the driver depresses the tow vehicle's brake pedal.

In addition, the trailer's electric brakes can be applied independently — without applying the tow vehicle's brakes — through the in-cab controller. This feature allows the driver to use the trailer's brakes to help bring mild trailer sway under control.

ADAPTERS

Many people tow more than one kind of trailer, so towing packages often include a wiring adapter. One end of the adapter plugs into a seven-way connector on vehicles with towing packages, and



A HEAVY-DUTY FLASHER IS needed when towing. If not used, the turn signals will be too dim and may go unseen by other motorists.

the other connects to a flat four-wire connector. Adapters also are sold at trailer dealers and hitch-installation centers.

If you tow trailers with different wiring systems, you'll need more than one adapter. For each trailer with a different connector, you'll need an additional plug-in adapter.

FLASHERS

Although most vehicles equipped with trailering packages feature a heavy-duty flasher, some older vehicles, or those without factory trailering packages, may need a heavy-duty flasher installed.

The standard flasher is not designed to operate more than the vehicle's lights, so it overloads

when the additional draw of a trailer's lighting system is added. This causes the tow vehicle and trailer turn signals to flash rapidly and/or faintly. From the driver's seat, the dashboard turn-signal lights will also flash faintly to alert you that a stronger flasher is needed.

Changing to a heavy-duty flasher will solve the problem. Be sure you get the right heavy-duty replacement by reading the packaging carefully to make sure it is designed for trailering applications. The flasher is usually located under the dashboard, and on many vehicles it is mounted in the fuse box and simply plugs in and out.

WIRING

If doing your own wiring, simply follow the requirements (see the accompanying wiring chart), but be aware that some automotive manufacturers require a special wiring harness that is included only with the towing package. This system has a built-in sensor to prevent electrical damage to the vehicle's lighting system or onboard computer.

If you are wiring such a vehicle, kits are available that connect directly to the vehicle's battery, not to the vehicle wiring.

For boaters, disconnect wiring before launching or retrieving a boat. If you don't, the bulbs and lenses will be hot and when they touch cold water, there's a good chance they'll crack. Though a bulb change may not seem a major catastrophe, if the taillights are sealed units you will have to replace the entire assembly. Plus, you won't have any trailer lights while returning home, which is both dangerous and illegal.

CONVERTERS

All imports and several domestic tow vehicles use an international lighting system in which the turn-signal lights are separate from the brake lights. This is indicated by an amber lens for turn signals, and a red lens for lights. The American lighting system combines the turn signals and brake lights into one wire instead of two, and has no amber lenses. If the tow vehicle has an inter-

national system, the two separate wires for turn signals and brake lights on the tow vehicle must be combined into one. This is the only way for the trailer's lighting system to work properly, and to accomplish this, a converter is necessary.

A converter is a circuit board built into a small, waterproof box or built directly into a connector. The built-in one is preferable because it reduces the number of wires needed to activate it, so it is not necessary to have a separate box that needs to be mounted elsewhere.

Usually, three or four wires coming from the tow vehicle — left and right turn, and brake wires — go into the converter and two come out. The two wires coming out are connected to the left and right turn connectors in the trailer-plug receptacle.

PREVENTIVE MAINTENANCE FOR WIRING

Always check your trailer lights before you leave home. If they don't work, the most likely cause is dirt or oxidation on the contact points. Be sure that all connector-plug prongs and receptacles, light-bulb sockets, wire splices and ground connections to the trailer are clean and shielded from moisture.

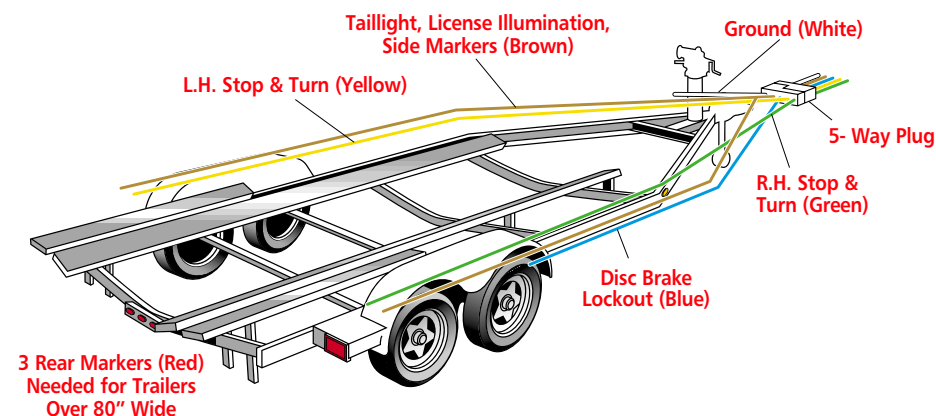
A little petroleum jelly or light waterproof grease spread on the surfaces will act as a barrier against air and moisture, retard oxidation and keep the lights operating longer. Melt solder around all wire-to-wire splices, then wrap them tightly with electrical tape or, better still, with marine-grade, heat-shrink tubing to seal out dirt and moisture.

Make it a habit to scrape the prongs clean with a penknife or sandpaper. Try to scrape off any surface deposits in the connector holes with an ice pick, rat-tail file or small piece of sandpaper rolled around a toothpick (be sure the lights are off when you do this, otherwise it could blow a fuse). Then, dab a little grease on the prongs, push the connector together and wrap electrical tape around the crack to keep out dirt and moisture.

Between uses, keep both halves of the plug protected from weather and scuffing. To keep dirt from getting into the connecting plugs, wrap the plug with a small, plastic bag slipped over the top of each half. Then wind a rubber band around the open end to seal it.



BEFORE TOWING, always check to be sure all trailer lights are functioning properly.



A TYPICAL WIRING PLAN for a boat trailer with disc brakes.

Trailer Hitches

What You Should Know About Hitches

Hitches come in many configurations for a variety of uses. Some very large boat and camping trailers (35-plus feet) use fifth-wheel or gooseneck hitches that mount in the bed of a pickup. Here, however, we will focus on those used for the majority of boat and camping trailers, frame-mounted hitches ranging from Class I to Class V. We'll also discuss the accessories needed for the safe and proper use of these hitches.

HITCH CLASSIFICATIONS

Four basic classifications are given to conventional hitches: Class I (up to 2000 pounds); Class II (2000 to 3500 pounds); Class III (3500 to 5000 pounds); and Class IV (5000 to 10,000 pounds). Hitch makers have also begun to use the designation of Class V to indicate a heavy-duty, frame-mounted hitch especially designed for towing loads greater than 10,000 pounds. These are considered as weight-carrying or "deadweight" ratings — which means the hitch supports all of the trailer's tongue weight.

Hitches are rated for Gross Trailer Weight (GTW) and Tongue Weight (TW). Many Class III and Class IV hitches have weight-distributing capabilities, which means they can be used to distribute tongue weight to the front of the

tow vehicle and to the trailer's axle(s). This helps keep the tow vehicle level, and reduces the weight carried on its rear axle.

Before choosing a hitch, you need to know your total towed load. Keep in mind that you can tow a lighter load with a heavier hitch, but you cannot safely tow a heavier load with a lighter hitch.

TONGUE WEIGHT

Before we go any further, let's talk about tongue weight, which is defined as the weight of the trailer on the hitchball. This can vary considerably, depending on how a trailer is loaded, and how a boat or other load is positioned on the trailer.

Since most trailer boats have a heavy engine on the rear, and a long tongue (the distance from the trailer axle to the hitchball) they often have lighter tongue weights (compared to the towed weight) than travel trailers. Typical tongue weights for travel trailers should be 10 to 15 percent of the total weight. Boat trailers commonly have tongue weights of 5 to 8 percent. So it's not unusual for a trailer boat to have a tongue weight of 200 pounds on a 4000-pound towed weight, while another type of trailer may have a 600-pound tongue weight for the same towed weight.



Too much tongue weight can affect the distribution of weight on the tow vehicle's axles (too much on the rear axle, not enough on the front axle) which, in turn, can affect the tow vehicle's steering, handling and braking. Most vehicle manufacturers provide a recommended maximum tongue weight when not using a weight-distributing hitch. Greater tongue weight than recommended by the vehicle builder will require a weight-distributing device in order to restore proper vehicle-axle weight loads and performance. Hitches also have maximum tongue weight ratings, called out as maximum deadweight pounds and weight-distributed pounds.

CLASS I HITCH

The smallest and lightest weight-carrying hitch is a Class I, and it's intended for loads less than 2000 pounds. It comes in three basic types: a bumper mount, a bumper/frame mount and as part of a step bumper.

A bumper-mounted hitch is not recommended for towing by most automotive manufacturers. Today's vehicle bumpers are generally made of a light alloy or aluminum. Some are steel, but few have sufficient strength to handle anything but the lightest loads. Aside from not having sufficient strength, modern bumpers — especially those on automobiles — can cause a galvanic reaction between the bumper alloy and the steel hitch, which can lead to corrosion and eventual failure.

In addition, depending on the way it is installed, a bumper hitch can create a jerking action when towing that upsets modern impact bumpers by damaging the bumper's energy-absorbing system.

Step-bumper hitches found on trucks don't always have tow ratings, and some are for decorative purposes only. Even though a step bumper may have a hole drilled through it for a hitchball, the bumper itself may not be strong enough to handle a bouncing tongue load.

If you choose a step bumper setup, be sure the bumper is properly constructed for towing and that it has a tow rating stamped into the metal. Some automotive original equipment manufacturers (OEM), as well as aftermarket manufacturers, offer step-bumpers with high tow ratings.

CLASS II HITCH

Class II hitches are frame-mounted, which means they connect to the frame or structural crossmembers of the vehicle, not to the bumper. They are rated to tow up to 3500 pounds.

Some vehicles may need extra bracing to help support this hitch. On a uni-body vehicle, for example, the hitch is bolted to sheetmetal, rather than to a heavy-gauge, steel frame. Without extra support, the bolts can pull away from the sheetmetal. Factory-installed hitches usually have an extra metal plate for support

when the tow package is ordered. Top-quality hitch manufacturers also offer the extra support necessary for a strong installation.

There are a few variations in Class II hitches. One has a ball-mount permanently built into the hitch assembly. Others use a receiver, which has a removable ball-mount (drawbar) that fits into a square hole.

CLASS III/IV HITCHES

Once you get into Class III (up to 5000 pounds trailered weight, 500 pounds of tongue weight) and Class IV (up to 10,000 pounds trailered weight, 1000 pounds of tongue weight) hitches, you're into the heavy-duty towing category. This is the area in which you will almost certainly need a truck and a frame-mounted receiver hitch. Most important is that you'll be getting into very heavy tongue weights that can affect the way your vehicle handles and tows.

Although a 500-pound tongue weight may not sound like a lot, that weight takes on a different perspective when it's pushing down on a hitchball that might be 6 feet behind the rear axle. This creates a six-foot-long lever, drops the rear of the tow vehicle and the front of the trailer, and lifts the front steering wheels of the tow vehicle.

The result of too much tongue weight can be sloppy steering, loss of traction at the front wheels, and bottoming out at the rear of the tow vehicle, which can cause loss of control.

Suspension aids may help some, but the best remedy is a weight-distributing hitch. Be aware, too, that some Class IV hitches are only rated to tow up to 10,000 pounds with weight-distribution equipment.

HEAVY DUTY HITCHES

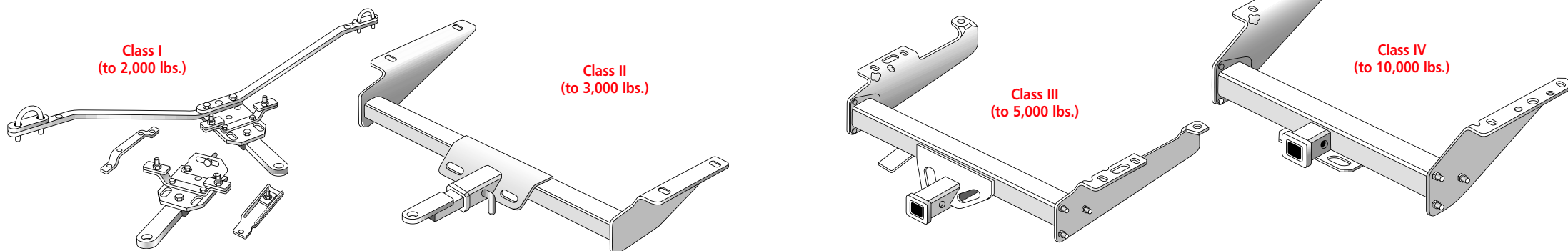
These are large, heavy-gauge steel hitches designed for large trucks with high tow ratings. They are designed to tow loads over 10,000 pounds GVWR. They can be used as dead-weight hitches, if the rear axle of the truck has a high enough rating. Otherwise, most are used with a weight-distributing system for better tow vehicle handling characteristics.

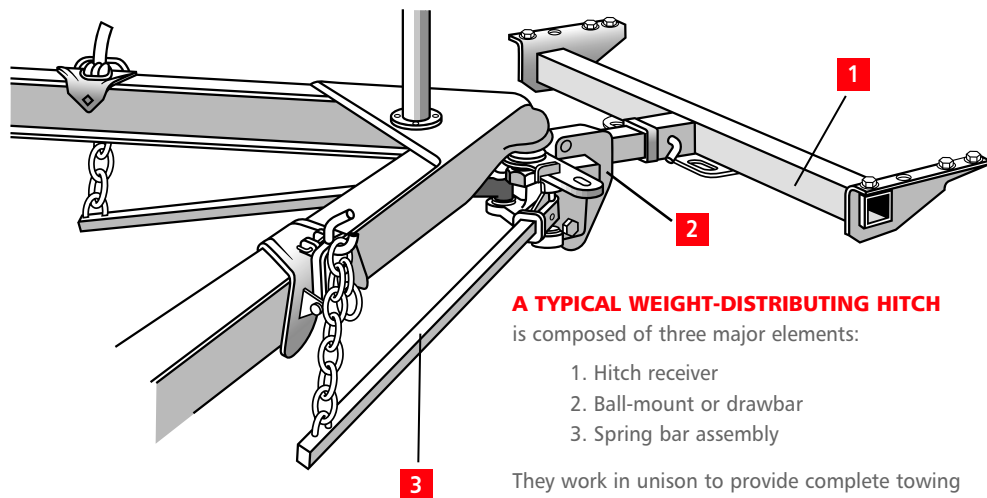
One manufacturer is marketing a heavy duty hitch (10,000 pounds GVWR and up) as a Class V hitch, but according to SAE J684, there is no such classification.

WEIGHT-DISTRIBUTING SYSTEMS

A weight-distributing or load-equalizing hitch system helps spread the trailer's tongue weight more evenly between the front and rear axles of the tow vehicle and the trailer's axle(s). The result is a more stable and controllable tow vehicle and trailer. Weight-distributing systems are generally used for towing large trailers with heavy tongue weights. Many of today's larger hitches (Class III, IV and V) can accept drawbars designed for use with weight-distributing systems, so you typically won't have to install a separate hitch for towing heavier trailers.

HITCHES ARE CLASSIFIED by how much towed weight they can handle.





A TYPICAL WEIGHT-DISTRIBUTING HITCH

is composed of three major elements:

1. Hitch receiver
2. Ball-mount or drawbar
3. Spring bar assembly

They work in unison to provide complete towing system compatibility.

A weight-distributing system consists of a frame-mounted receiver and spring bars (also called equalizing bars) that attach to a special ball-mount assembly and to a trailer-tongue-mounted platform. The bars have chains connected to snap-up brackets mounted on the trailer tongue. The length of the chains can be changed to adjust distribution of the tongue weight. The spring bars

act like handles on a wheelbarrow. As the wheelbarrow handles (spring bars) are raised upward, some of the tongue weight is lifted off of the rear wheels and shifted forward to the front wheels and the trailer axle(s).

Spring bars are available in different tension ratings. Choose bars that are rated equal to or more than the tongue weight of the trailer. If

the tongue weight of the trailer is not known, use approximately 5 percent of GVWR for boat trailers, and 10 percent of GVWR for conventional camping trailers.

If the spring bars are too stiff or set with too much tension, they can cause loss of rear wheel traction on slippery surfaces. For example, if using a rear-wheel-drive vehicle at a launch ramp, it will be necessary to remove the spring bars when launching and retrieving. Otherwise, the spring bars can cause the rear wheels to spin as the weight-distributing system lifts the back of the vehicle to transfer weight to other parts of the vehicle and trailer.

If using surge brakes, it is important that the weight-distributing system's bars are set perfectly parallel to the trailer's surge coupler to allow the trailer brakes to work properly. (This is not necessary if your trailer is equipped with electric brakes.) For example, if the coupler does not plunge properly because too much upward tension has been applied by the bars and chains, the trailer brakes can lose effectiveness. Check with the manufacturer of your surge-brake coupler for information on how to set the chains. Various adapters are also available to compensate for surge brakes and/or trailer design.

HITCH GUARANTEE

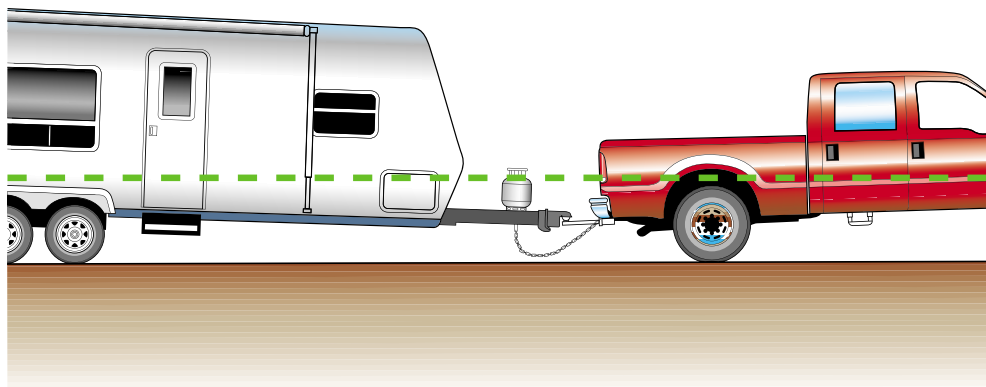
Not all hitches are alike. A number of years ago, hitch manufacturers set a standard for hitch safety that was called "V-5." This standard required numerous tests to ensure hitches met specific safety standards. However, this standard is no longer used throughout the industry.

While you may still see labels touting the V-5 standard, the best way to assure yourself of a hitch's construction integrity is to contact the manufacturer to verify that its product meets SAE J684 standards.

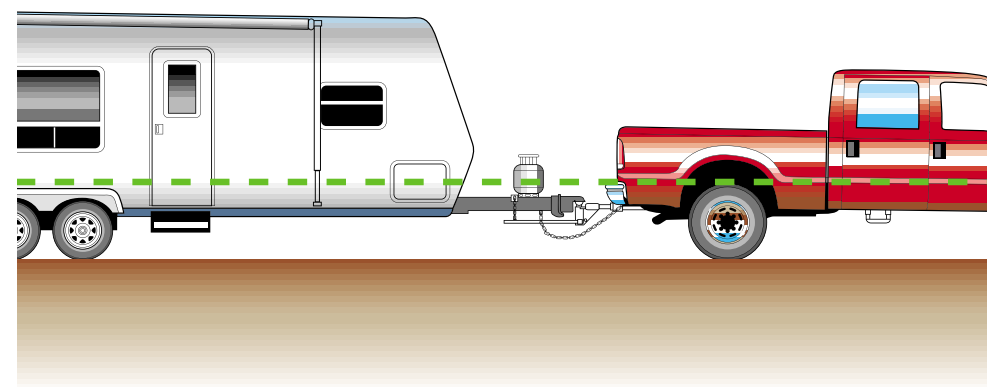
HITCBALLS

Hitchballs come in three basic sizes: 1½ inches (up to 2000-pound tow rating, sometimes more); 2 inches (up to 6000 pounds); and 2½ inches (up to 10,000 pounds or more). Some hitchballs have extended bases and shanks for special purposes.

Be aware that hitchball bases and shanks play significant roles in a hitchball's weight rating. Also, some shanks may be slightly undersize or oversize. On step-bumper hitches especially, be sure the shank (in American measurements) conforms to the hole (which may be in an off-size metric equivalent, especially on some import trucks). Above all, be sure the ball is the proper size for the trailer's coupler, since a ball that is too small may allow the coupler to bounce loose.

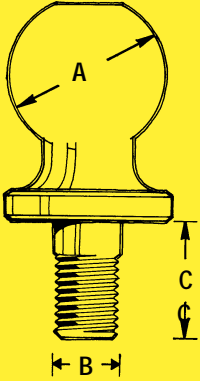


CONVENTIONAL WEIGHT-CARRYING HITCHES, which place the bulk of the load on the tow vehicle's rear axle, are usually well suited for light to medium loads, but often cause sagging or handling problems when pulling heavy rigs.



A WEIGHT-DISTRIBUTING HITCH'S SPRING BARS help distribute the load evenly across the tow vehicle's front and rear axles, and the trailer's axle(s). This results in improved handling and control when towing large, heavy loads.

HITCHBALL SPECIFICATIONS AND SELECTION CHART

HITCHBALL PARTS	BALL DIA. (in.)	SHANK DIA. (in.)	SHANK LENGTH (in.)	RATING (lbs.)
 <p>A—Ball Diameter B—Shank Diameter C—Shank Length</p>	1 ⁷ / ₈	3 ⁴ / ₄	1 ¹ / ₂	2000
	1 ⁷ / ₈	3 ⁴ / ₄	2 ¹ / ₈	2000
	1 ⁷ / ₈	3 ⁴ / ₄	—	2000
	1 ⁷ / ₈	1	2	2000
	2	3 ⁴ / ₄	1 ¹ / ₂	3500
	2	3 ⁴ / ₄	2 ³ / ₈	3500
	2	3 ⁴ / ₄	3 ³ / ₈	3500
	2	1	2 ¹ / ₈	6000
	2	1	3 ³ / ₈	6000
	2	1 ¹ / ₄	2 ¹ / ₄	8000
	2 ⁵ / ₁₆	1	2 ¹ / ₈	6000
	2 ⁵ / ₁₆	1 ¹ / ₄	2 ¹ / ₄	10,000
	2 ⁵ / ₁₆	1 ¹ / ₄	2 ¹ / ₄	10,000

DATA PROVIDED BY DRAW-TITE

BALL AND SHANK diameters increase as weight ratings increase.

A little-known, and little-used requirement for hitchballs is a “torque recommendation” for the attaching nut. Usually, a hitch installer will just tighten it with as much strength as he can muster — but that procedure won’t always ensure longevity of the nut and threaded portion of the hitchball. The general rule for tightening procedures — using a torque wrench — is 85 lb.-ft. (Class I), 105 lb.-ft. (Class II), 235 lb.-ft. (Class III) and 300 lb.-ft. (Class IV).

Regardless of which hitch you choose, keep in mind that it must be street-legal, and that each state has its own requirements. You must use safety chains (in some states the chains must be closed-loop fastened) and a break-away trailer-braking system. And it’s always a good idea to have some way to lock the coupler in place; certain actions while towing can uncouple a trailer if there is no safety device to hold it in place.



Launching and Retrieving

How to Launch and Retrieve Your Boat

Before you launch your boat, be sure to use the checklist at the back of this booklet so you don’t forget something important — such as installing the drain plug. You should spend several minutes preparing your boat for launching before you even get in line to use the ramp. This is the time to remove any rear tiedowns, attach docklines and fenders, turn the battery switch and blower on, put gear in the boat, and generally get ready. Disconnect the trailer wiring at this point, allowing the bulbs to cool so they don’t pop when hitting the water.

If your boat trailer has disc brakes, it’s likely to have an electric disconnect solenoid that allows the brakes to unlock when backing up. If so, you can disconnect the harness plug from your tow vehicle, but keep the pin (blue wire) that powers the backup

solenoid plugged in. Don’t remove the winch strap until the boat is fully immersed in water.

When you are ready to launch your boat, remember to go slowly. If you try to move quickly, mistakes are more likely to occur. Before backing down, especially at a new launch site, it is always a good idea to check the ramp. A slippery ramp can make the trailer and tow vehicle slide farther into the water than is desirable.

Once again, it’s always best to back the trailer to the left. This allows you to see the entire trailer through the side mirror or by sticking your head out the window. If you back to the right, you will be backing blind and may need a spotter to give you hand signals.

Back down until the trailer wheels are at the water’s edge. At this point, someone should be



LOAD ALL OF YOUR GEAR and perform all pre-launch preparation, such as making sure your drain plug is in and the transom tie-down straps are removed, prior to backing down the ramp.



WHEN BACKING DOWN THE RAMP TO LAUNCH, be sure to maintain clear rearward visibility. Backing slightly to the left will help the driver to see the entire rig. Use a spotter if necessary to assist launching with hand signals. Trailer style and ramp conditions dictate how deep the trailer must be submerged for launching or loading.



CLEAR THE RAMP AS SOON AS the bow is resting on the bow stop, the winch hook is secured and the engine or drive is raised.

placed in the boat. Now, back down farther so the boat's drive system is submerged to pick up cooling water. Start the engine and let it warm up. Make sure the propeller is clear of obstructions and disconnect the winch hook from the bow eye, or have a helper do it. If necessary, signal the driver to back down farther to get enough water under the boat to float it off the trailer.

As a matter of safety, blocks should be placed under the rear wheels of the tow vehicle anytime the driver is not behind the steering wheel. Once the boat is free, you can pull forward and park the tow vehicle and trailer.

RETRIEVING

Retrieving is more difficult for the skipper than for the tow vehicle driver. Once the driver is let off at the dock to get the trailer, backing down the ramp is easier because there is no boat to create blind spots.

Since empty boat trailers provide less to see, and therefore less to help you determine which way the trailer is moving as you back down the ramp, you may need to angle the trailer more to

maintain a good view. However, be sure the trailer is straight enough when it is dunked into the water to make entry easy for the boater.

The style of trailer you have will dictate how deeply it must be submerged for loading. Roller-style trailers are designed for winching the boat onto the trailer, and don't have to be dunked as far as a bunk trailer. Be sure the boat driver can see the bunks or fenders of the trailer so they can be used as a guide for positioning the boat. Some trailers offer vertical guideposts on both sides of the trailer (you can also purchase and install them yourself) to make it easy to see in the water. Watch for hand signals from the boat driver to move the vehicle (and trailer) forward or backward.

Once the trailer is in place, set the tow vehicle's emergency brake and place the shift lever in park; in the case of a manual transmission, shift into low gear and turn off the engine. Once the boat reaches the bow stop, connect the bow strap. Don't begin to pull out until the bow strap is secured and the engine or outdrive is raised completely to clear the ground.



SECURELY STRAP DOWN

the stern of the boat prior to getting on the road after a day on the water.

Put your foot on the brake pedal, place the gear selector into low gear, release the emergency brake, then begin pulling up the ramp slowly. If the ramp is slick, don't use too much power. If your vehicle has four-wheel drive, this may be a good time to use it. If the wheels start to spin, try going up the ramp at a slight angle, effectively reducing the grade.

When at the parking area, be sure everything is properly stored. Loose items will be a problem on the highway. Don't forget to reconnect the trailer lights and put the rear tiedown straps back on. Most important, after a long day of fun on the water, don't be in a hurry to get home without following the proper procedures and precautions.

Safety Checklist

Checklist for Safe Towing, Launching and Loading

You can never be too safe when trailering, and just as any good pilot goes over his safety checklist before taking off, it's a good idea to approach towing in the same manner. The following is a checklist of important items you need to address every time you tow your trailer.

PRE-TOWING CHECKLIST FOR TRAILER BOATS AND TRAVEL TRAILERS

- ▼ Check cold tire pressures on the tow vehicle and trailer. Improperly inflated tires can cause catastrophic tire failure.
- ▼ Turn off all propane (or other fuel) sources and all electric lights and accessories.
- ▼ Make sure you are towing the trailer in a level attitude. If not, you need to adjust the height of your hitchball. If you don't have an adjustable-height drawbar assembly, purchase a drawbar that will position the hitchball correctly.
- ▼ Make sure the lug nuts on the tow vehicle and trailer are tight. Lug nuts should be tightened to a specific torque setting with a torque wrench (see your owner's manual). Do not use, or allow the use of an impact wrench to tighten lug nuts — you may have trouble getting them loose by hand when trying to change a flat.
- ▼ All safety equipment should be stowed in the boat. This includes U.S. Coast Guard (USCG) requirements for PFDs (life jackets), a throwable flotation device, fire extinguisher, whistle or horn, distress signals, and whatever else USCG and local regulations require.
- ▼ The engine or outdrive should be in the full "up" position and secured.
- ▼ If a boat cover is used when towing, it must be properly secured or it will blow off or tear while traveling.
- ▼ Be sure the coupler is secured. As insurance, insert a nut and bolt or other locking device into the hole in the coupler so it won't accidentally pop open, possibly allowing the trailer to become disconnected from the hitchball.
- ▼ Be sure the trailer jack (and all jack stands on a travel trailer) are raised and locked in place. Jacks that are dragged on the road are potentially dangerous, and can also damage the jack, trailer or tow vehicle.
- ▼ Check that the trailer wiring is properly hooked up and working. Have a partner stand behind your trailer and tow vehicle to double-check that all your lights are functioning correctly. Don't assume they are.
- ▼ Be sure the safety chains and emergency brake cable are in place and properly secured so they won't fall off.

- ▼ Check that the boat hull is snug with the bow stop and secured with a chain or tiedown. Do the same with the rear tiedowns.
- ▼ All equipment inside the boat or travel trailer should be properly secured.
- ▼ With the trailer hooked up and ready to tow, make sure all tow-vehicle mirrors are properly adjusted.

BOAT PRE-LAUNCH (IN PARKING AREA)

- ▼ Remove tiedowns.
- ▼ Remove engine support.
- ▼ Disconnect trailer wiring from tow vehicle.
- ▼ Load and stow gear to be carried on the boat.
- ▼ Check boat systems: engine, blower, bilge pumps, lights.
- ▼ If the boat has one, turn on the engine-compartment blower.
- ▼ Make ready docklines, fenders and boat hook.
- ▼ Don't forget to install the drain plug!

BOAT LAUNCH (ON RAMP)

- ▼ Back down the ramp far enough to allow engine cooling water to be picked up.
- ▼ Set the emergency brake, put the vehicle in park, and block the rear wheels. With a manual transmission, put the vehicle in first gear, turn the engine off, set the emergency

brake and block the rear wheels. Do the same when retrieving the boat.

- ▼ Lower the engine or outdrive.
- ▼ Start the engine and let it warm up.
- ▼ Disconnect winch hook from bow eye.
- ▼ Proceed to launch.

BOAT RETRIEVAL

- ▼ Do not submerge the trailer too deep. Most boats load more readily if the boat's bottom can center itself in the trailer bunks or rollers when the boat is about one-third to half the distance forward on the trailer.
- ▼ Approach the trailer slowly, calculating wind and current direction and strength.
- ▼ Nudge the boat's bow into the center of the trailer before winching or powering onto the trailer. Always check local regulations that may prohibit power loading.
- ▼ Raise the engine or outdrive before winching the boat onto the trailer or driving up the ramp.
- ▼ Clear the ramp area as soon as the bow is resting on the bow stop, the winch hook is secured and the engine or drive is raised.
- ▼ Finish tying down the stern, and secure your rig for the road — away from the ramp if possible.
- ▼ Remove the drain plug.
- ▼ Wash the trailer and boat, and flush the engine with fresh water as soon as possible.



2004 State Towing Laws

Road Rules for All 50 States

Towing laws across the United States vary from state to state. Most were designed around rules that pertain to big-rig commercial trucking. Therefore, it is difficult to transfer some of the rules to recreational towing. It is always best to contact your state's motor vehicle department for any special regulations that pertain to recreational towing, and know the laws for any state you may travel through.

Even though the chart shows the maximum towing speeds, in most cases, these speeds apply to interstate highways. Some states have lower limits for rural roads. Always obey the posted speed limits.



STATE	MAX. TOWING SPEED (mph)	MAX. TRAILER LENGTH (feet)	MAX. TRAILER WIDTH (feet)	MAX. TRAILER HEIGHT (feet)	MAX. OVERALL LENGTH (feet)	WEIGHT REQUIRING TRAILER BRAKES
Alabama	70	40'	8'	13½'	57'	3000
Alaska	55	40'	8½'	14'	75'	5000
Arizona	55	40'	8'	13½'	65'	3000
Arkansas	65	(N/A)	8½'	13½'	(N/A)	3000
California	55	40'	8½'	14'	65'	1500
Colorado	65	45'	8½'	13'	70'	3000
Connecticut	65	45'	8½'	13½'	75'	3000
Delaware	55	40'	8½'	13½'	70'	4000
Dist. of Columbia	55	40'	8'	13'	55'	3000
Florida	65	48'	8½'	13½'	65'	3000
Georgia	55	(N/A)	8'	13½'	55'	3000
Hawaii	55	40'	8½'	13½'	65'	3000
Idaho	65	48'	8½'	14'	75'	1500
Illinois	55	60'	8'	13½'	60'	3000
Indiana	55	40'	8½'	13½'	60'	3000
Iowa	65	48'	8½'	13½'	65'	3000
Kansas	55	45'	8½'	14'	(N/A)	(N/A)
Kentucky	65	(N/A)	8'	13½'	65'	(N/A)
Louisiana	70	30'	8'	13½'	70'	3000
Maine	55	45'	8½'	13½'	65'	3000
Maryland	65	(N/A)	8'	13½'	55'	3000

Massachusetts	65	33'	8½'	13½'	75'	(N/A)
Michigan	55	53'	8'	13½'	65'	3000
Minnesota	70	48'	8½'	13½'	60'	3000
Mississippi	55	50'	8½'	13½'	75'	2000
Missouri	70	(N/A)	8½'	13½'	60'	(N/A)
Montana	65	(N/A)	8½'	13½'	65'	3000
Nebraska	65	40'	8½'	14½'	65'	3000
Nevada	65	(N/A)	8½'	14'	70'	3000
New Hampshire	55	(N/A)	8½'	13½'	48'	(N/A)
New Jersey	65	40'	8½'	13½'	62'	(N/A)
New Mexico	75	40'	8½'	14'	65'	3000
New York	65	45'	8½'	13½'	60'	3000
North Carolina	55	48'	8½'	13½'	60'	4000
North Dakota	70	60'	8½'	14'	75'	(N/A)
Ohio	55	40'	8½'	13½'	65'	2000
Oklahoma	65	(N/A)	8½'	13½'	65'	3000
Oregon	55	40'	8½'	14'	50'	(N/A)
Pennsylvania	55	53'	8½'	13½'	60'	3000
Rhode Island	65	48½'	8½'	13½'	60'	4000
South Carolina	55	53'	8½'	13½'	(N/A)	3000
South Dakota	65	53'	8½'	14'	80'	3000
Tennessee	70	48'	8'	13½'	65'	3000
Texas	70	(N/A)	8½'	14'	65'	4500
Utah	65	48'	8½'	14'	65'	(N/A)
Vermont	65	48'	8½'	13½'	72'	3000
Virginia	55	(N/A)	8½'	13½'	65'	3000
Washington	60	48'	8½'	14'	75'	3000
West Virginia	65	48'	8'	13½'	55'	3000
Wisconsin	65	48'	8½'	13½'	65'	3000
Wyoming	65	60'	8½'	14'	85'	(N/A)

Source: Digest of Motor Laws, AAA

Towing Resources

For More Information

Copies of *Your Guide to Towing* can be downloaded from the Trailer Boats' website, or obtained at select boat and RV shows around the country or by contacting:

Trailer Boats

20700 Belshaw Ave.
Carson, CA 90746
310/537-6322
trailerboats.com

Camping Life

20700 Belshaw Ave.
Carson, CA 90746
310/537-6322
campinglife.com

Bass&Walleye Boats

20700 Belshaw Ave.
Carson, CA 90746
310/537-6322
bassandwalleyeboats.com

National Marine Manufacturers Association

200 E. Randolph Drive
Suite 5100
Chicago, IL 60601
312/946-6200
discoverboating.com

Ford Trucks

Customer Relations Center
P.O. Box 6248
Dearborn, MI 48126
800/392-FORD
fordvehicles.com/trucks

Sea Ray Boats, Inc.

2600 Sea Ray Blvd.
Knoxville, TN 37914
800/SRBOATS
searay.com

Jayco Inc.

P.O. Box 460
Middlebury, IN 46540
800/RV-JAYCO
jayco.com

Trailer Manufacturers Assoc.

200 E. Randolph Drive
Suite 5100
Chicago, IL 60601
312/946-6200
discoverboating.com

NMMA CERTIFIED TRAILERS

The National Marine Manufacturers Association (NMMA) has developed a boat trailer certification program. An NMMA Certified Trailer is one that is built by a manufacturer that complies with established industry standards and federal safety regulations. The certification tells the consumer that the boat trailer's design meets the standards set forth in the NMMA Trailer Certification Handbook. The standards are based on those published by the Society of Automotive Engineers (SAE) and in the Code of Federal Regulations (CFR) Title 49. Look for the NMMA Certified label when shopping for your next boat trailer.



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