

## 20 / STORAGE & WINTERIZATION

The checklists and procedures in this section will help you take a systematic approach to preparing your trailer for storage in cold-weather conditions. These checklists do not include every detail required, and you may want to expand them to suit your needs, or perform the tasks in an order that suits your situation and work style. The sections are not necessarily presented in the order that you should do them. Other manuals included with your trailer may contain more detailed procedures for some of the items on these checklists. Contact your dealer or MVP RV for additional suggestions suitable to your climate and storage conditions.

### CHASSIS

- If possible, select a storage area that is dry, well-ventilated and protected from wind and sunlight. A garage would be ideal, but a protected outdoor area will be fine.
- Lubricate all grease fittings on the axle hubs.
- Check all tires for damage and set tire pressure to the maximum as indicated on the tire sidewall. Clean the tires and wheels with your regular soap/car wash solution. It is not necessary or desirable to treat the tires with any commercial tire dressing.
- Wash the trailer underside. Hose off any accumulations of mud and/or road salts on frame, axles, and other chassis components. This is also a good time to inspect the underside of the trailer. Look for obvious damage, and for small cracks, separations, or openings in storage compartments. Check for any damaged components or wear.
- Park the trailer as level as possible front to rear and side to side. Use blocks or ramps under the wheels, if necessary.
- Be sure the breakaway switch activating pin is secure in the switch. Coil and stow the 7-way power cord.
- Grease the hitch king pin (5th-wheels) to prevent rust and corrosion.

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- Block the tires front and rear. Cover tires with cloth, plywood, or aftermarket tire covers to protect them from ultraviolet exposure from the sun (if stored outdoors).
- Check tire pressures every 30 days during long-term storage. Maintain the maximum rated cold inflation pressure.

## BODY/EXTERIOR

- Close all vents and windows, and thoroughly wash the exterior, including roof, sidewalls and front and rear caps. Be sure to remove all debris, road grime, bugs, tree sap, bird droppings, etc.
- While washing, make note of any maintenance that may be needed. Closely inspect the sealants around roof accessories (vents, antennas, racks, etc.) and windows and doors. Reseal as necessary before winter rains or snows accumulate.
- Cover all exterior appliance vents (water heater, refrigerator, range hood) to prevent insects, small birds or other creatures from getting in.
- Extend the awnings (if equipped). Sweep or vacuum away branches, leaves, and any other debris. Wash both the tops and bottoms of the awnings with a mild, natural soap. This will help reduce the growth of mildew on the awnings. Allow them to dry completely before retracting them. After they are dry and still extended, spray a light coat of silicone-based lubricant on all metal moving parts.
- Extend the slide-outs (if equipped) and prepare them for storage:
  1. Wipe down all exposed mechanical slide components: gears, rails, shafts, etc. Look for any damage, or caked accumulation of grease and dirt. Remove any of this accumulation.
  2. Check the exterior rubber slideout seals. Look carefully for any tears or splits in the seals. This would be a good time to have repairs made. Clean the seals with soap and water. After cleaning, apply a coating of **303<sup>®</sup> Protectant** to the seals. Use clean cloths to spread the protectant evenly over the surface of the seal. Allow to air dry.
  3. Leave the slideouts extended for now. Retract them after your interior preparation is completed.

- Check inside all exterior compartments. Remove anything that you don't intend to store. Vacuum out the compartments and carefully wipe down components inside. Look over any exposed wiring. Check for loose connections or damaged wires. Make any repairs now. Wipe down the rubber seals around the doors and apply **303® Protectant**. Lock all exterior compartments (except propane compartment).
- Lubricate locks, hinges and latch mechanisms with silicone-based lubricant.
- If the trailer is parked outdoors, remove any high grass and weed accumulation under and around the trailer, as necessary.

### PROPANE SYSTEM

- Turn off all propane appliances: refrigerator, range/oven, water heater, furnace.
- Close the main outlet valves on the propane cylinders. Cover the regulator and cylinders to keep moisture out.
- Remove all food from the refrigerator and freezer. Wash down the interior walls with a mild soap solution. An open box of baking soda or other absorbent inside will help reduce odors. Block the doors open slightly to allow air to circulate.
- Turn off the range and oven burners. Clean the top and oven interior. Turn off any pilot valves.

### PLUMBING SYSTEMS

Proper preparation and winterization of the fresh water and waste water systems is vital to the continued safe and effective operation of these systems. Freezing water expands and can rupture tubing, fittings, tanks, and fixtures. Damage from freezing could be extensive and very expensive to fix. Since you will be running water and antifreeze solution through the drain piping into the gray and black water holding tanks, we'll winterize the fresh water system first, and finish the job with the waste water system. Be sure to dump the holding tanks before starting winterization.

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**NOTICE**

Be sure the water in the water heater is cool before beginning winterization.

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 **WARNING**

Use only RV water system antifreeze for winterization. Do not use automotive coolant antifreeze (ethylene or propylene glycol). Automotive antifreeze is poisonous.

- Turn off the water heater and let it cool. Turn off the water heater electrical circuit breaker to prevent accidental operation with a dry tank. To drain the water heater, remove the plug at the bottom of the heater and open the pressure relief valve near the top of the heater. When all water is drained from the heater, close the pressure relief valve and replace the drain plug. Set the bypass valve to prevent filling the water heater with antifreeze.
- Open the tank drain valve to drain the fresh water tank. If you have a full or nearly full tank, be prepared for the full capacity of the tank to drain. Close the valve when the tank is completely drained.
- Open all faucets, both hot and cold, in the galley, bathroom and shower. Open the shower head valve. This will allow the water in the lines to flow to the low point drains.
- Open the system low point drain valves. These are the lowest points in the water system. The low point drains are located under the trailer. Drain out all water. Close the low point valves when ALL water is drained.
- Press the toilet flush pedal to completely drain the water from the toilet.
- Remove the water filter cartridge, if equipped. If you are draining for storage, do not reinstall the filter cartridge. Store the cartridge in a safe place. Turn off the supply valve to the filter.
- Disconnect the outside shower hose (if equipped) and drain the hose. After all water is drained from the hose, reconnect hose.

**FOR STORAGE IN FREEZING CONDITIONS:**

- Add potable RV antifreeze to the system. MVP RV recommends disconnecting the water pump inlet tube and pumping antifreeze from a container into the system.
  1. Close the fresh water tank drain valve and the low point drain valves. Close all faucets, and be sure the water purifier (if installed) supply valve under the galley is closed.
  2. Disconnect water pump inlet line. Attach a 3' or 4' length of hose to the pump inlet port, and put the other end of the hose into at least a one-gallon container of RV water system antifreeze. Do not use automotive coolant system antifreeze.

3. Be sure the trailer 12-volt electrical system is activated. Turn the water pump **ON** to pressurize the cold side of the fresh water system. Pump about a gallon of antifreeze into the system. Put the free end of the hose into another container of antifreeze. Open each faucet – lavy, shower, galley, exterior shower and wash-up faucets – until the antifreeze solution flows freely. Close each faucet when you see the antifreeze. Open the toilet water inlet valve and activate the toilet flush valve so antifreeze gets into the toilet. With the system pressurized, press the check valve in the city water inlet until antifreeze flows out.
  4. Open the low point drain valves until you see antifreeze flowing out, then close the valve.
  5. Turn off the water pump, disconnect the temporary hose, reconnect the inlet tubing and open all faucets.
- Winterize the refrigerator ice maker (if equipped).
1. Push the ice maker arm up to the OFF position.
  2. Remove the vent from the exterior side of the trailer.
  3. Close the water shutoff valve for the ice maker.
  4. Place a shallow pan under the water solenoid valve.
  5. Disconnect the water supply line from the water solenoid valve. Drain the water from the supply line.
  6. Unscrew the plastic nut and disconnect the water line from the outlet side of the water solenoid valve. Drain the water from the ice maker line.
  7. Reconnect both lines to the water solenoid valve in their original locations. Leave the water shutoff valve closed.
  8. Dry out the ice maker mold assembly with a soft cloth.
  9. Remove the white ice maker AC power cord from the outlet.
- Be sure water pump and water heater switches are OFF.
- Clean up around the dump valves and fittings. Be sure the dump hose is clean and dry. Pull off the termination caps, clean around the sealing rings and reattach them. Cycle the dump valves a couple of times. Spray a silicone-based lubricant on the actuating shafts and mechanisms.

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- Pour one or two cups of RV antifreeze down each lavy, galley, and shower drain. Pour a couple of cups into the toilet, and operate the flush valve.
- Cap the holding tank drain, city water inlet, and fresh water fill inlet. Coil and store the fresh water hose, waste hose and flushing hose.

## PREPARING THE ELECTRICAL SYSTEMS FOR STORAGE

Preparing the electrical systems for storage mainly involves the batteries and the generator (if equipped). Properly storing the batteries will ensure that they will be able to power up your systems when you take the trailer out of storage, and that you get the maximum life from the batteries.

- If possible, remove all batteries and store them in a clean, dry location. Arrange them in a way that allows you to get to them for periodic recharging during the storage period.
- If you can't remove the batteries, disconnect the cables and clean the terminals. Remove any dirt and/or acid buildup. Clean the tops of the batteries and dry thoroughly. Reattach the cable, and apply a battery terminal protectant.
- Check the charge in each battery with a hydrometer.** Be sure the specific gravity in each cell is no less than 1.260. Recharge as necessary. A fully charged battery will not freeze until 50 or 60 degrees below zero, but a partially discharged one may freeze at only 20 degrees above zero. A frozen battery is a ruined battery. Checking the voltage is not a good way to determine battery charge. A battery that measures 12 volts is already 75% discharged. A fully charged battery will measure about 12.63 volts at 77 degrees F. The hydrometer/specific gravity method is the best way to determine battery charge level.
- Check the charge in the batteries every 30 days. Recharge to specific gravity of at least 1.260.
- Change the oil and oil filter in the generator (if equipped).
- Turn off any unnecessary DC and AC loads. Turn devices off, open the main battery disconnect switch.
- Unplug all 120-volt AC appliances. Turn off all AC breakers, including the main breakers at the main panel. You may want to do this after all interior preparations have been completed, leaving it as the last things you do.

- Clean and re-coil the shore power cord. Check the plug end of the shore power cord. Clean the prongs with electrical contact cleaner or a ScotchBrite® pad.

## INTERIOR

- Thoroughly clean the interior. Remove all traces of food, including pet food. Vacuum in and under cabinets. Remove all canned goods and personal items if they contain liquids that will freeze. A burst can or jar of food can be a real mess to clean up in the spring.
- Open closet doors, drawers, and cabinets so air can circulate through. This will help reduce the buildup of condensation and musty odors.
- Close and cover all vents to prevent entry of snow, etc.
- Close and lock all windows. Turn vent fan and range hood fan switches OFF.
- Turn off all radios, TVs, interior and exterior lights.
- Close curtains and/or miniblinds, and pull shades. This will help reduce fabric fading from exposure to sunlight.
- Remove, clean or replace air conditioner filter.
- Remove batteries in clocks and other battery-operated devices such as smoke detectors. Leave the cover off the smoke detector to remind you to replace the battery when reactivating the trailer after storage.
- After all cleaning chores are complete, and you are ready to leave the trailer, do a walk-through to make sure you haven't forgotten something.
- When exiting the trailer, close and lock the entry door, and retract the entry step.
- Check the condition of the trailer weekly.
- During long-term storage, operate the air conditioning system (if equipped) periodically to lubricate the compressor seals. Operate the slideout(s) several times to keep seals from sticking, and to lubricate the mechanism. Reconnect batteries or connect to shore power.

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## REACTIVATING THE TRAILER AFTER EXTENDED STORAGE

If the trailer was properly and carefully prepared for storage, getting it ready for another travel season should not be difficult. The following checklist assumes that you stored the trailer with care. If damage from freezing or other serious deterioration has occurred, please consult with your dealer or MVP RV for advice on how to get your trailer back to operating order.

If you have added checklist items of your own, make sure those items are covered as you prepare your trailer for travel.

- Thoroughly inspect the outside of the trailer. Look for animal nests in wheelwells, in compartments, or in other out of the way places.
- Remove all appliance vent covers, roof vent covers, or other coverings. Be sure all furnace, water heater, and refrigerator openings are clean and free of debris.
- Open all doors and compartments. Check for animal or insect intrusion, water damage, or other deterioration.
- Check charge level in all batteries. Refill and recharge as necessary. Reinstall batteries, if necessary. Be sure cables ends and terminals are clean and free of corrosion. **Always install the positive (+) cable first.**
- Close the main battery disconnect switch.
- Check tire pressures. Reinflate to specified cold pressure.
- Check wheel nuts and torque to correct values. See the **Wheel Nut Torque Table** in Chapter 6.
- Lube chassis and axles. See the axle maintenance guide in your Owner's Package.
- Check all exterior lights, and replace as necessary.
- Remove covering from inside windows, if necessary.
- Open vents and windows for interior ventilation.
- Drain, flush and sanitize the fresh water system as outlined in the **Care and Maintenance** chapter. Inspect the drain hose for leaks. Replace the hose if necessary.
- Install a new fresh water filter cartridge (if equipped).
- Operate all faucets and fixtures in the fresh water system. Check for leaks at all joints and fittings. Repair any leaks.
- Check all 12-volt DC circuit fuses.

- Operate all 12-volt DC lights and equipment.
- Install new batteries in battery-operated devices. Check the operating guides for these devices for additional operating information.
- Test the carbon monoxide, propane and smoke detectors and alarms.
- Check the monitor panel operation.
- Open and operate vents and vent fans, including the range hood fan.
- Inspect the 120-volt AC electrical system. Check the shore power cord, converter, all outlets, and any exposed wiring. If defects are found, refer service to your dealer.
- Prepare the generator (if installed) for operation following instructions in the generator operating manual. Make sure the main circuit breakers are off.
- Start and run the generator (if equipped). Check the generator exhaust system for leaks or deterioration.
- Operate 120-volt appliances and trailer air conditioning system (if equipped).
- Inspect the propane system and check for leaks as described in the **Care and Maintenance** section. If the propane cylinder(s) appear rusted or corroded, have them inspected by a qualified propane service center.
- Operate each propane appliance. Observe all burner/pilot flames for proper color and size.
- Inspect and clean the interior.
- Check sealants around all roof and body seams and windows. Reseal if necessary as outlined in the **Care and Maintenance** section.
- Check and lubricate fittings and hinges on ramp door(s), if installed.
- Wash and wax the exterior. Inspect the body for scratches or other damage. Touch up or repair as necessary. Flush the underside of the trailer thoroughly.

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## SEVERE WEATHER USE

Your RV was designed primarily for short-term use in moderate temperature and climate conditions. Generally, this means in temperatures between 0 degrees F. and 110 degrees F. There may be situations when you may choose to use the RV outside of this range. But you must be aware that the plumbing systems, heating and cooling appliances, and structural components of the RV are not appropriate for long term use in either the coldest or warmest climate conditions.

Before you consider using your RV in temperature extremes, please take time to read this section. We've provided some guidelines for operating various systems and appliances in either very cold or very hot weather. We've also provided some life-style tips if you intend on using your RV in temperature extremes. Please also be aware that although the components and appliances in your RV will perform very well within their design specifications, damage to components, appliances or RV structural materials while used in severe weather conditions may not be covered under the warranty. If you intend to store your RV during severe winter weather, please see the **"Storage and Winterization"** section of this chapter. Operating and living in your RV during the winter requires some preparation and additional equipment and materials. You will also need to learn to more closely manage your electrical and propane resources.

Successfully using your RV in extreme cold temperatures generally means doing three basic things: **1) keeping heat in, 2) keeping cold out,** and **3) adding heat where it's needed.** This guide will give you a few tips on dealing with those three basics.

### PLUMBING SYSTEMS

Of all the systems in your RV, the fresh and waste water plumbing will require the most attention during extreme cold weather use. Freezing can cause extensive damage to the plumbing that can be very costly to repair, and will not be covered under warranty.

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The fresh water and waste tanks, and most of the plumbing pipes and fixtures are **not** in heated compartments. The plumbing pipes run through the walls or under the floor. Some are exposed to the outdoors and can freeze.

**Know where all of the plumbing on your RV is located.** Take a close look around and find where your tanks, outdoor fixtures, indoor plumbing, drain valves, and water pump are located. Look under the RV, and in all the compartments. The plumbing components that are exposed to the outside are much more prone to freezing since they are directly exposed to outdoor air temperature.

► **Keep the heat in**

Look all around the outside underside of the trailer. Wherever you find plumbing fixtures, piping, etc. is a good place to stuff in insulation material such as fiberglass wool. Look especially for pipes where they enter through the floor or sidewalls. Those are good places to put extra insulation. And don't forget to keep the interior of the RV heated. If you're expecting extremely cold temperatures, open cabinet doors and drawers in the galley and bathroom. The plumbing fixtures are closer to the outside walls in these areas and will freeze faster. If you leave the doors and drawers open, the interior heat will have a chance to keep the plumbing above freezing.

► **Keep the cold out**

Exterior utility compartments are directly exposed to outside temperatures. The exterior compartment (if equipped on some models) can be stuffed with insulation if you don't have to get into it often. You can also cut out pieces of foam insulating material to fit inside the door to help keep out the cold.

If you are going to be situated for several weeks or months during severe cold weather, consider installing insulated underskirting all around the trailer. Small ceramic heaters and heat tape can be used under the trailer and around plumbing components. Try to seal up as many gaps as possible to keep cold winds and snow from getting under the trailer.

► **Add heat where it is needed**

The most effective way to protect the water tanks, water pump, fresh and waste water plumbing is to add heat in the areas where it is needed.

Keep the compartment doors closed. Foam insulating material can be cut to fit inside the compartment doors and help keep the heat inside. Check inside occasionally to make sure everything is okay.

If you have AC power available, wrap the fresh water inlet plumbing and waste lines with heat tape. Plug the heat tape into an extension cord. Be sure to follow all installation and use instruction provided by the heat tape manufacturer.

► **A few more tips:**

Thoroughly drain water from hoses before you store them. If you don't and you need to use a hose, it will probably be frozen. You can take hoses inside to thaw out if need be, or use a hair dryer.

Drain holding tanks before they are completely full during cold weather camping. This will reduce the chance of freezing, resulting in damage to the holding tanks.

Leave the water heater turned on whenever the water heater tank is full so there is no chance of it freezing.

Depending on your travel situation, you might consider traveling with the water system winterized. Take bottled water along for drinking and other needs like cooking, washing up and brushing your teeth when the RV is winterized. Even with the fresh water system winterized, you can still use the bathroom facilities. Gallon jugs filled with water can be used in the toilet. If your holding tanks are not heated you can put some RV antifreeze in the holding tanks to prevent the contents from freezing. Add the RV antifreeze through the toilet for the black water holding tank and down the shower or tub drain for the gray water tank. The antifreeze will also protect the shower or tub P-trap which is usually located below floor level. The amount of antifreeze required for the holding tanks will be based on the

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size of the tanks, and it will be necessary to add more RV antifreeze as waste water is added to the tanks to prevent the antifreeze from being diluted.

## ELECTRICAL SYSTEM

The batteries and generator (if equipped) will be your primary electrical system concerns. If you are connected to shore power, you will likely have all the power you need to operate appliances and the battery charger. You will also have the necessary power if you have a generator **IF** you properly prepare it for extreme temperature operation. This will mean making sure the correct weight of oil is installed, and the engine is in good tune. Preparing the generator for cold weather is relatively inexpensive. But if you can't get it started or if it fails during extremely cold weather, it is no better than not having a generator. Be sure it is well-prepared for the traveling conditions you expect.

If you expect to dry camp – that is without the benefit of shore power or a generator – **the batteries are the most critical part of the electrical system since they will be your only source of electrical power.**

**If the batteries are not kept fully charged, they will freeze.** If they freeze, they will be destroyed. You must measure specific gravity with a hydrometer to determine battery state of charge. A voltage reading will not give you useful information. *A battery that measures 12 volts is already 75% discharged. If the battery measures below 12 volts, the battery will freeze at a much higher temperature.* Use the **Battery State of Charge** table on the next page to see the relationships between voltage, specific gravity, temperature and state of charge.

The batteries, fully charged, will not last more than about 10 hours in zero-degree weather depending on battery condition and 12-volt loads. In extreme temperatures, don't plan on relying on batteries for longer than this unless you have a means to charge them. If you expect to stay longer than overnight, you should expect to either have 120-volt AC power nearby or run the generator (if equipped). Minimize your use of electric power if AC power is not available or you cannot run the generator. Without shore power or a generator to run the charger, you can charge batteries with your tow vehicle alternator

### **WARNING**

**Do not under any circumstances operate any engine while sleeping. You would not be able to monitor outside conditions to assure that engine exhaust does not enter the interior, and you would not be alert to exhaust odors or symptoms of carbon monoxide poisoning.**



Electrolyte Temperature		Specific Gravity @ % SoC					Voltage Reading @ % SoC				
°F.	°C.	100%	75%	50%	25%	0%	100%	75%	50%	25%	0%
120	48.9	1.249	1.209	1.174	1.139	1.104	12.663	12.463	12.253	12.073	11.903
110	43.3	1.253	1.213	1.178	1.143	1.108	12.661	12.461	12.251	12.071	11.901
100	37.8	1.257	1.217	1.182	1.147	1.112	12.658	12.458	12.248	12.068	11.898
90	32.2	1.261	1.221	1.186	1.151	1.116	12.655	12.455	12.245	12.065	11.895
<b>80</b>	<b>26.7</b>	<b>1.265</b>	<b>1.225</b>	<b>1.190</b>	<b>1.155</b>	<b>1.120</b>	<b>12.650</b>	<b>12.450</b>	<b>12.240</b>	<b>12.060</b>	<b>11.890</b>
70	21.1	1.269	1.229	1.194	1.159	1.124	12.643	12.443	12.233	12.053	11.883
60	15.6	1.273	1.233	1.198	1.163	1.128	12.634	12.434	12.224	12.044	11.874
50	10.0	1.277	1.237	1.202	1.167	1.132	12.622	12.422	12.212	12.032	11.862
40	4.4	1.281	1.241	1.206	1.171	1.136	12.606	12.406	12.196	12.016	11.846
30	-1.1	1.285	1.245	1.210	1.175	1.140	12.588	12.388	12.178	11.998	11.828
20	-6.7	1.289	1.249	1.214	1.179	1.144	12.566	12.366	12.156	11.976	11.806
10	-12.2	1.293	1.253	1.218	1.183	1.148	12.542	12.342	12.132	11.952	11.782
0	-17.8	1.297	1.257	1.222	1.187	1.152	12.516	12.316	12.106	11.926	11.756

**Temperature-Compensated Battery State of Charge (SoC) Table**

through the 7-way connector charge line. If you do this, monitor battery charge with the monitor panel or measure specific gravity with a hydrometer.

Cold weather preparation for your RV batteries is the same as for your car or truck: keep them clean, keep the electrolyte level correct and keep the cables and terminals clean and dry. A battery terminal protectant spray or paste can help keep corrosion to a minimum.

### **RUNNING GEAR AND BODY**

Prepare your RV chassis, running gear and body as you would your car or truck. A good coat of wax will help protect the exterior panels. Be sure tires, bearings, brakes and exterior lighting are all in good operational condition. Many locations use corrosive substances to de-ice roads. Whenever you can, use fresh water to flush the undercarriage and rinse off accumulations of mud and road salts.

Before traveling in severe weather, do a thorough inspection of exterior sealants. Water that gets into walls or under the roof area can cause severe damage. Open seams or moldings can become filled with water and freeze causing even more damage from expanding ice.

Be sure roof vents, furnace, refrigerator and water heater exhaust vents and the generator exhaust system

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are not damaged and are functioning properly. Faulty exhaust vents can allow the buildup of deadly carbon monoxide.

## INTERIOR

Outside of comfort heating, humidity and condensation will be your main concerns during cold weather. Moisture buildup on walls, the ceiling and even in closets can cause damage and lead to mold and mildew formation. This Owner's Guide has a detailed section on humidity and condensation control. Please see that chapter for more information as you plan your cold weather RVing activities.

Cold weather comfort involves the same three basics as keeping your plumbing systems working: **1) keeping heat in; 2) keeping cold out; and 3) adding heat where it is needed.**

The best heat source is the RV's forced air furnace. It will consume more propane than any of the other propane-fired appliances. The propane tank or cylinders should be full before leaving on your trip. Monitor the propane supply carefully during your stay.

### ► Keep the heat in

Much of the heat inside your RV will escape through the windows. Cover the windows with curtains, drapes or almost anything to help hold some of the heat in. Foam or other insulating material cut to fit the windows can help cut down on heat leakage during the night. Several plastic films are available that can be applied to window frames with adhesive and then shrunk with a hair dryer that will act like storm windows to help keep the heat in and help reduce the formation of condensation on the window glass.

You can stuff insulation or heavy cloths into the slideout mechanisms and other openings that will help reduce drafts.

Use overhead and range vents to reduce the humidity inside the RV. A cross-flow of outside fresh air using the overhead vents will be better at conserving heat than opening windows or exterior doors. In very severe weather, you can cover or

block the insides of roof vents with plastic or foam insulation.

Weather-strip doors and windows. Cold little drafts in your main residence are annoying; they are much more serious in a recreational vehicle.

A few throw rugs over uncarpeted flooring can add another thermal layer.

When you arrive at your destination, try to select a site that will be exposed to the sun throughout the day, but also where there is some type of wind break available. Position the RV on the site so the front or rear rather than the side will be facing into the wind. And if possible, situate so that the side with the utility connections (water, sewer, electrical) is on the sunny side.

#### ► **Keep the cold out**

The best way to keep the cold out is to avoid opening doors and windows. Avoid opening the entry door as much as possible.

Block off sections of the RV you won't be using with blankets or sheets. The more heat where you are the better. That doesn't mean that you shouldn't heat parts of the RV, just keep most of the heat in the areas where you will be spending most of your time.

Check all around doors, windows and other openings for drafts or cold air. Block these areas with blankets, carpet or other insulating materials to help keep the cold out.

#### ► **Add heat where it is needed**

There may be times in exceptionally cold weather when you will have to add heat to the interior. If you are connected to shore power or can operate a generator, use low-wattage electric ceramic heaters for spot heating an area. **Never use the range or oven for interior comfort heating.** These appliances produce deadly carbon monoxide when they are operating. If you use electric heaters, be sure to follow all instructions. Do not place the heaters near upholstery, clothing or other flammable materials.

#### **WARNING**

**It is not safe to use cooking appliances for comfort heating.**

#### **WARNING**

**Some upholstered components and mattresses, carpet, and insulation products are made of urethane foam. Urethane foam is flammable!**

**Urethane foams burn rapidly, releasing great heat and consuming oxygen very quickly. Lack of oxygen is a danger of suffocation hazard. Hazardous gases released by the burning foam can be incapacitating or fatal to human beings if inhaled in sufficient quantities.**

**Do not expose urethane foams to open flames or indirect high temperature sources of ignition such as burning operations, welding, burning cigarettes, space heaters, or unprotected electric light bulbs.**

If you have 120-volt power at your site, turn on the tow vehicle engine block heater (if equipped) overnight to ensure the engine will be warm for a quicker start in the morning. If you don't have a block heater, a trouble light placed under the engine oil pan or near the battery can help with cold-weather starting.

## PERSONAL COMFORT AND SAFETY

Extreme temperature and weather conditions require that you prepare yourself for the conditions you may encounter. Extreme cold weather is often experienced in places where the weather can change rapidly. Watch for sudden weather changes. Always carry a survival kit in your vehicle. The kit should contain flashlights, batteries, rain ponchos, a portable weather radio, first aid kit, nonperishable packaged or canned food and a manual can opener, blankets, prescription and nonprescription drugs, pet supplies, bottled water and any special items for infants, elderly or disabled family members. What you put in this survival kit is up to you, but be sure to include everything you might need.

You must be prepared with appropriate clothing, fuel supplies and food. Adding these extra severe-use items may affect the load you carry in your RV and how you load it. Equip your tow vehicle with snow tires or have tire chains available when conditions warrant their use. Watch for ice on roads and trails. Always obey posted speed limits and proceed with caution.

No matter what extreme weather conditions you may encounter – whether extreme heat or extreme cold – remember that you may be isolated. You may be far away from food and fuel supplies, other RVers, and emergency help. If you have cell phone service, be sure your service is usable in the areas where you intend to travel. Always tell someone where you are going, how long you plan to be gone, and how to contact you in case of emergency. An aftermarket GPS system can be a good emergency preparedness investment.

## WEATHER PLANNING

Many RVers do not take into consideration the weather conditions at their travel destination. When you travel

several hundred miles a day in your RV the weather conditions can change several times. The weather is often the last thing on your mind. Severe weather can occur without much warning, and if you are caught in it, it can be disastrous. RVers need to have an emergency plan in case of a severe storm.

The National Oceanic Atmospheric Administration (NOAA) Weather Radio (NWR) is a nationwide network of radio stations that broadcast continuous weather information directly from a nearby National Weather Service Office. They broadcast National Weather Service warnings, watches, forecasts and other hazard information 24 hours a day. Alerts inform people if they need to take some type of action in order to protect themselves.

Consider both a portable GPS unit and a weather radio receiver as part of your travel gear. Receivers are available in many price ranges depending on the quality of the receiver and its features. It is well worth the investment to be able to pinpoint your exact location and to know what type of weather to expect when traveling or camping in your RV. For more information on the NOAA Weather Radio visit their website at [www.nws.noaa.gov](http://www.nws.noaa.gov) It is a good idea to monitor the weather radio while traveling.

Develop an emergency evacuation plan in case of severe weather. When you arrive at a campground, ask about emergency plans in case of a severe storm such as a tornado, or a thunderstorm with high winds. If the campground doesn't have a plan, you need to make your own. Locate a structure that is safer than your RV, like a bathhouse or the campground office. Always stay on the lowest level possible and away from doors and windows. Tell everyone who is with you about the emergency plan. Explain to children how to respond to different disasters and the dangers of severe weather, fires, and other emergencies. Instruct children on emergency exits. Instruct them on how and when to call 911 or other emergency phone numbers. Make sure everybody knows exactly what his or her job is in case of severe weather. Monitor the weather radio for emergency information. Emergency weather watches and warnings are posted for counties and towns, so always check a map for the county or town where you are staying.



**Travel trailers are high-profile vehicles and are subject to the effects of wind.**

**Be aware of and pay attention to wind advisories and warnings in the areas where you travel and/or camp.**

**Do not use your RV to take shelter during severe weather. Seek shelter when severe weather or tornado warnings are issued.**

