

# Generalized Procedures to Winterize RV by Blow Out Method

(Note: consult your RV manual for more specific information)

## **Warning: Users and bystanders must wear eye protection**

1. Disconnect city water from your RV.
2. Drain the fresh water and heater tanks in your RV, if equipped, per the manufacturer's suggested procedures. If such procedures are not available, use the following procedures. Release pressure from the tank using the pressure relief valve, if available. In some cases, the drain plug of a water heater is also the sacrificial anode rod, so the plug is connected to a long rod. Take this opportunity to check the condition of the anode rod. It is common and normal to have some surface corrosion on the sacrificial anode rod. However, if the rod is badly corroded and thin, consider replacing the anode rod or the entire water heater next season. **For your safety, never drain the water heater when it is hot.** If the drain plug has a tapered thread such as an NPT connection, apply Teflon tape to the tapered thread. Reinstall the drain plug. By-pass the tanks if your RV is equipped with by-pass valves.
3. If equipped, the refrigerator, water filter, water pump, washing machine, and dishwasher should be winterized according to manufacturers' recommendation.
4. Open all faucets to drain water by gravity. Water may drain out through the city water connection. Then, close all the faucets.
5. Attach an air compressor to the outdoor plumbing (city water inlet to your RV) using the enclosed adapter. An oil-free (a.k.a oil-less) air compressor is recommended. Oil-lubricated air compressors are not recommended because the compressed air produced might contain a small amount of lubrication oil from the compressor. If you are using an oil-lubricated air compressor, we recommend filtering the compressed air using suitable oil or coalescing filter.
6. Turn on the air compressor and allow it to fully charge. An air compressor with at least a 1 gallon tank is recommended. Regulate pressure to 30-40 psi.
7. Open each faucet one at a time (both cold and hot) to purge water from the plumbing until only air comes out of each faucet. Allow the air compressor to fully recharge between each faucet. Most air compressors are not designed to run non-stop for long periods of time, so allow the air compressor to cool down as needed. Flush the toilet to blow water out of the plumbing to the toilet.
8. Disconnect the air compressor from the RV.
9. If there is a low point valve(s), drain the residual water from the plumbing system from the low point valve(s).
10. Pour some non-toxic RV Antifreeze into the toilet and waste water tank.

Additional information: Residential water pressure in the USA usually ranges from 45 to 80 psi, so your plumbing system should be able to handle this pressure range. Although your plumbing system can handle higher pressure, most water lines can be effectively winterized with 30-40 psi air pressure. The key is to move a large amount of air at low pressure to evacuate water from the plumbing. You can blow out each zone two to three times if you wish to be extra safe. When you blow out the second time, the partially evacuated pipe will contain some compressed air that will act as a “secondary compressed air tank,” which will assist in removing more water. You do not need to remove all the water from the plumbing system. Air is compressible within the plumbing system, so the pressure build-up due to the volumetric expansion of ice will not be high enough to cause damage to partially evacuated pipes. In other words, the air in the partially evacuated pipes will act as an “air spring” to absorb the pressure build-up due to the expansion of ice.

Additional fun information: The volumetric expansion of ice in an open container will not cause damage to the container. For example, if you fill a metal or plastic cup with water and place the cup in a freezer, the cup will not break when the water freezes. This is because the top of the cup is not covered. The air above the water/ice allows the ice to expand freely in vertical direction. Damage will occur only if the pipe is completely filled with water and sealed. The expanding ice has nowhere to go, so pressure continues to build-up until it is high enough to cause the pipe to burst. This is because water is incompressible. On the other hand, if there is sufficient amount of air in the pipe, the air will act as an “air spring” to reduce pressure build-up because unlike water, gas is able to be compressed. Some pressure will still build up in the pipe, but the pressure will not be high enough to cause damage because the compressible air absorbs the pressure build-up. Therefore, if there is sufficient amount of air in the pipe, the pipe will not damage or burst due to freezing. This means that some amount of water in the pipes will not cause damage to the pipes. You only need to remove enough water from the pipes. The videos below show this principle in more details:

[https://www.youtube.com/watch?v=\\_IdWN1Lc\\_Rs](https://www.youtube.com/watch?v=_IdWN1Lc_Rs) (or use search term “\_IdWN1Lc\_Rs” on YouTube)

<https://www.youtube.com/watch?v=bkhJIW0UAoU> (or use search term “bkhJIW0UAoU” on YouTube)

<https://www.youtube.com/watch?v=4i5r65QGUpw> (or use search term “4i5r65QGUpw” on YouTube)