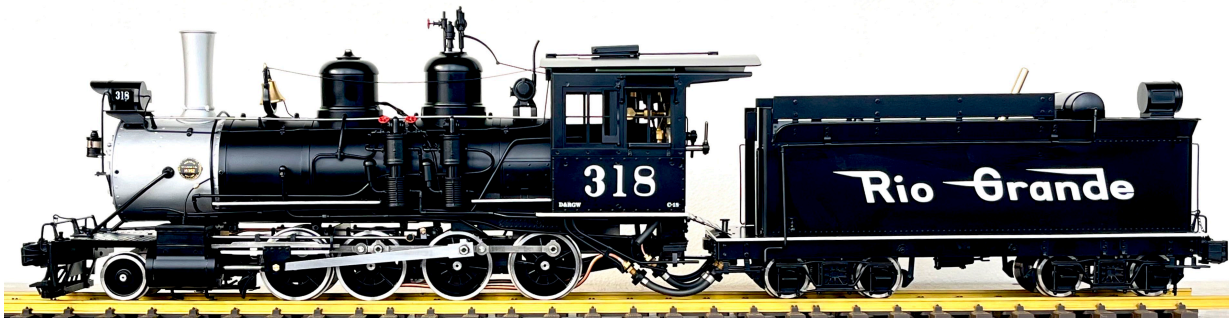
ACCUCRAFT TRAINS
ELECTRIC & LIVE STEAM MODELS



D&RGW C-18 2-8-0, 1:20.3 SCALE LIVE STEAM OPERATING INSTRUCTION MANUAL

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D&RGW C-18 2-8-0 Live Steam Manual

History of the C-18 2-8-0

The C-18 consolidations were all built by Baldwin locomotive works for the Florence and Cripple Creek Railroad between 1894 and 1895. Six of these wound up on the Denver and Rio Grande Western in 1924. The F&CC number 3 became D&RGW number 315 while the No. 5 became no 317, No. 7 became No. 320, and the No. 8 became No. 318. The No. 9 became No. 319 and the 11 became number 316.

The locomotives have 16" X 20" cylinders
The Drivers are 42" in diameter
The boiler pressure is set at 180 LBS.
Engine Weight is 85,000 LBS.
Tractive effort is 18,651 LBS.

These locomotives replaced most of the D&RGW's earlier 2-8-0's. Number 315 has been completely restored and can be seen running on the Georgetown Loop today. No. 318 is on display at the Colorado Railway Museum in Golden, CO.

Specifications

- 1:20.3 Scale, 45mm Gauge
- Live Steam or Electric
- Brass & stainless steel constructions
- Length: 31.25"
- Width: 6.2"
- Height: 7.6"
- Engine Weight: 12.4 lbs
- Tender Weight: 6 lbs

Features

- Butane Fired with Ceramic Burner
- Full Stephenson’s valve gear
- Optional Water Hand Pump in Tender
- Optional Axle Pump
- Pressure Gauge
- Water Level Gauge
- Boiler Blow Down Valve
- Cylinder Drain Cocks

General Information

Operating a model live steam locomotive is much different from running an electrically powered engine. It is a more hands-on, interactive experience. The locomotive must be periodically fueled, oiled and watered. As supplied, the locomotive is manually controlled, which means that you must actually drive the locomotive using the controls in the cab, just as you would a full-size engine. The performance of the engine is also unlike electric locomotives. The locomotive should pull a dozen or more standard-size freight cars on good, level track. Grades and sharp curves will diminish its capability. A good engineer will learn the engine’s characteristics and idiosyncrasies over time, to get the best performance and longest duration from it.

Safety

For your safety, there are certain rules that should be observed, as follows:

1. The safety valve has been set at the factory to release around 65 pounds per square inch of pressure. Only adjust the safety valve if it is not releasing at the proper PSI.

2. The ceramic burner firing system has been designed to use butane gas only. Never use pure propane. Care must be taken with a butane/propane mix as the storage pressures can reach unsafe levels.

3. Always refuel the engine away from other working live-steam locomotives. The butane fuel filling system allows a small amount of the gas to bleed off as the fuel tank is being filled. A passing engine can ignite this bleed-off gas or fuel, causing a potentially hazardous situation.

4. When lighting up the butane, light your match first, then turn on the gas.

5. A steam engine gets hot. Be careful when operating the controls and moving the model.

6. If the live steam model is stopped without the blower valve open creating draft, the fire from the burner may come out from around the firebox, which can cause damage or injury. The operation of the model should be observed carefully at all times.

Items Needed

- Aster/Accucraft Draft Fan (AP28-200 single speed draft fan or AP28-201variable speed draft fan)
- Steam Oil (AP28-203)
- Butane Gas
- Distilled Water
- Flathead screwdriver for removing lubricator cap

Recommended Items

- Steam Oil Syringe (AP29-201 or AP29-120)
- Gloves
- Matchstick or BBQ Lighter
- Gas can adapters (AP23-101, AP23-103, AP23-103)
- Goodall valve bottle

About Your Boiler

A good place to begin the firing process is to have a thorough understanding of your locomotives boiler and how it behaves. The boiler in your locomotive duplicates a full size boiler in all aspects, including significant areas of flat surface.

The major flat surfaces are the firebox front, sides and top, the boiler front sheet and the flat outside portions of the boiler wrapper surrounding the firebox.

Several of these boiler plates are flanged and all are assembled using a high strength, high temperature, silver bearing brazing compound. To maintain joint strength, those boiler plates exposed to the combustion process, more particularly the crown sheet, must be in direct contact with and covered at all times by the water in the boiler. This means WATER LEVEL IS CRITICAL.

The boiler is designed to function at a working pressure between 60 and 75 pounds per square inch. This pressure is continuously trying to collapse the crown sheet. The water level must be maintained above a point equivalent to the bottom edge of the blower pass through pipe at all times.

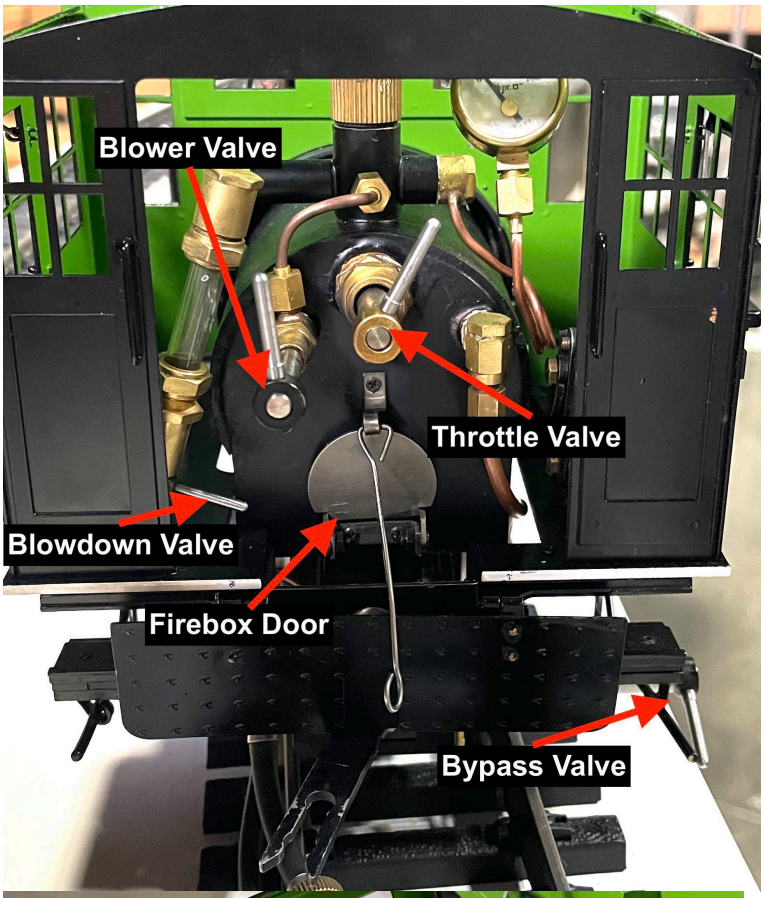
Maximum water level is not critical, but should not exceed the bottom edge of the top nut of the water gauge. Over filling the boiler results in the engine priming, or passing water to the cylinders, and can be noticed by a spray or mist of water coming from the cylinder exhaust or blower stream exiting the smokestack.

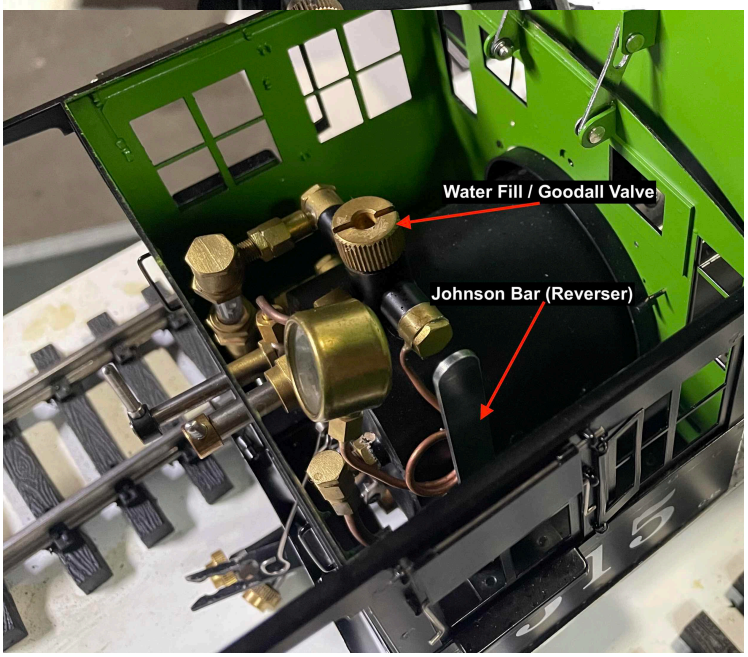
Water

Distilled water that has been ‘DEIONIZED” is extremely active electrically and should NEVER be used in your boiler. Often water Will be OZONATED to kill bacteria. Water that has been ozonated is acceptable as long as it has also been steam distilled.

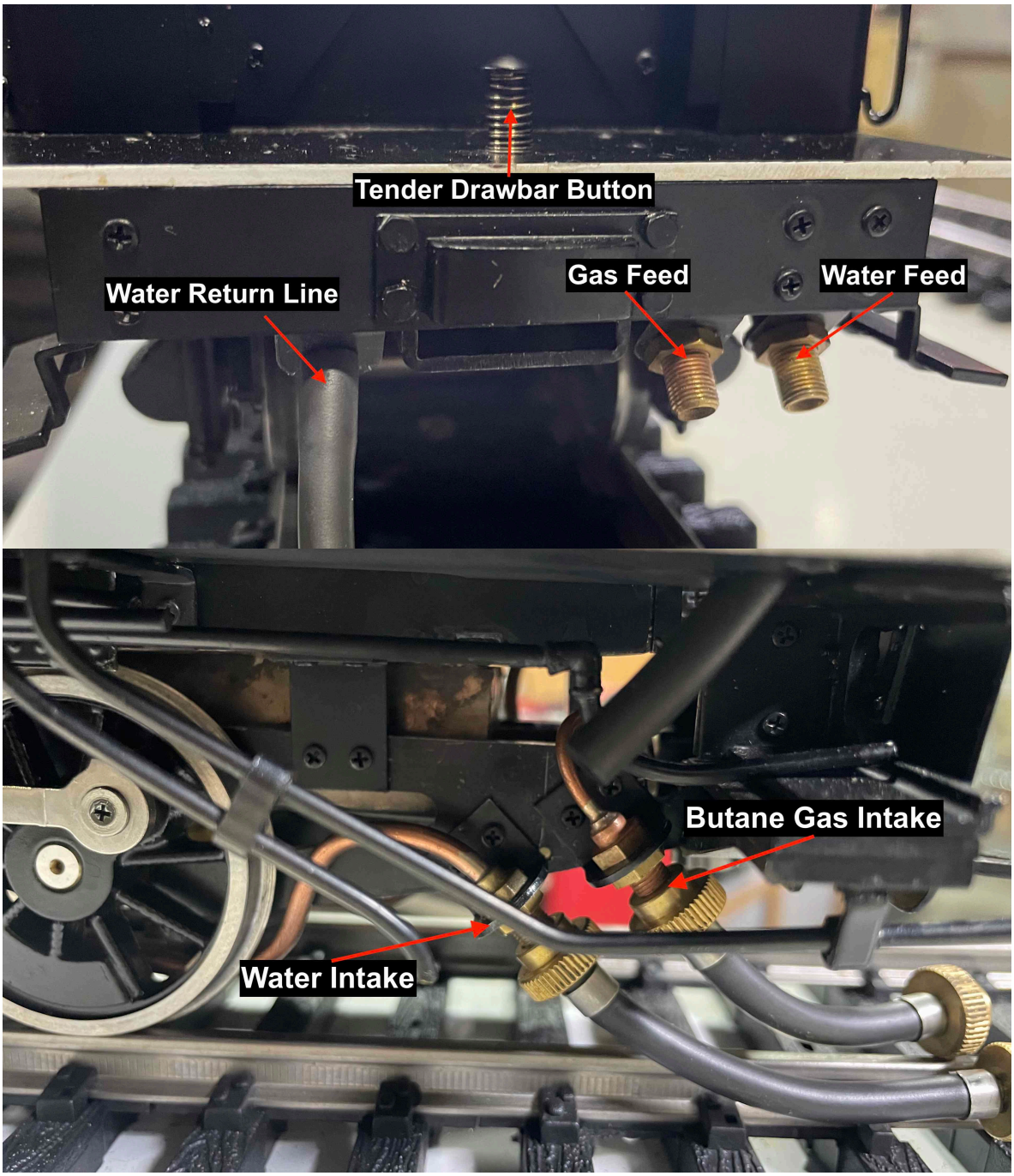
****** We recommend only the use of STEAM DISTILLED water in your boiler ******

Cab Controls

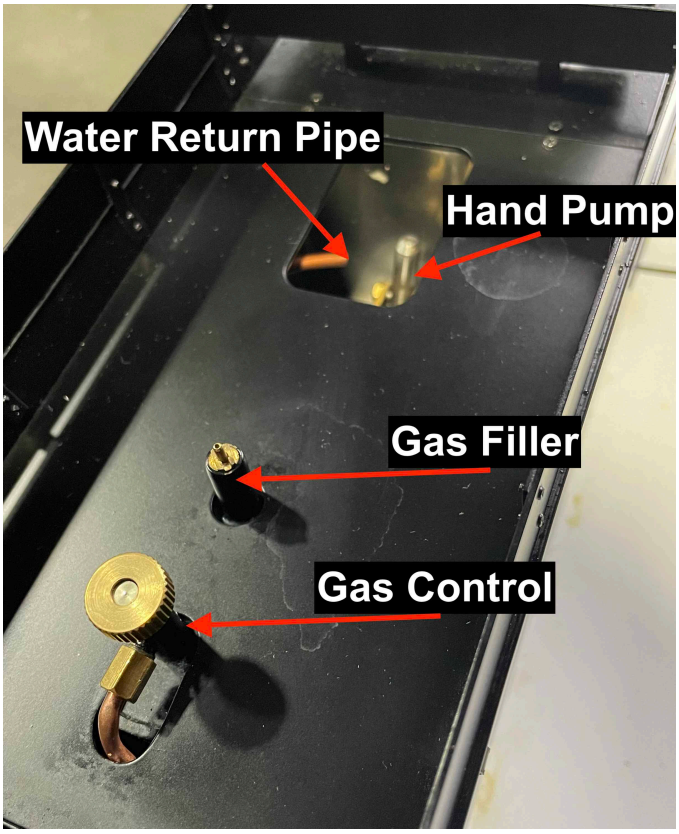




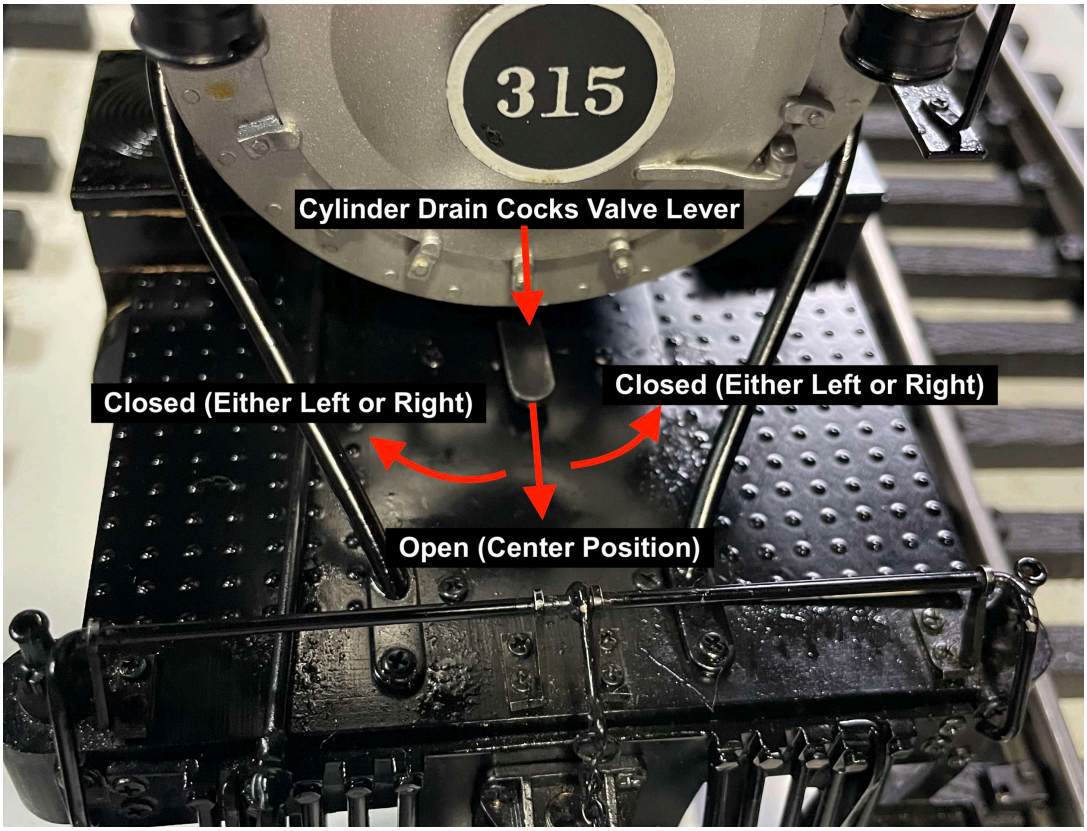
Tender to Locomotive Connections



Tender Controls



Cylinder Drain Cocks



Preparing the engine

A steam-locomotive engineer goes through a lighting-up ritual every time the engine is to be run. It is good to follow the same routine each time so that nothing is overlooked.

1. Oil all external moving parts of the engine, including wheel bearings, with a high grade, lightweight machine oil like 3-in-1. Be sure to oil all parts of the drive train, including the valve gear. A little oil is all that's necessary.

2. Place the engine on track. Connect the tender water and fuel lines to the locomotive. Ensure tight connections to prevent leaks of gas and water. Push on the tender drawbar button as you push in the drawbar to the tender.

3. The lubricator located on the right hand running board ensures the cylinders and valves are properly lubricated inside with steam oil.

Remove the lubricator cap with a flathead screwdriver and draw out any water or oil from any previous run with a syringe. Fill the lubricator, using only proper steam cylinder oil.

4. Water can be added via the filler cap at the top of the boiler or through the tender if the hand pump is equipped. Use only distilled water in your engine's boiler. Tap water contains minerals that will leach out and ultimately affect the performance of the engine. If going through the tender hand pump, add water into the tender tank. Close the bypass valve and use the handle to hand pump water from the tender into the boiler until the sight glass is 3/4 full. Do not overfill the boiler.

5. Finally, add fuel. Make sure the gas control valve on the tender is closed. Press the nozzle of the butane canister or butane can adapter firmly onto the filler valve that protrudes from the top of the tender. You will hear the gas transferring and will see a little gas bleeding out of the valve. When the tank is full, the gas will begin to splutter and much more gas will escape the valve. When the gas tank is full you are ready to fire up the engine. Add warm but not very hot water to the rear tank. This will keep the tank warm and the gas pressure up.

Firing Up

Close the throttle and the blower valve. Place a battery powered suction fan in the smoke stack but do not turn it on yet. Open the hinged firebox door at the back of the boiler in the cab and you'll be able to see the ceramic burner or the alcohol wicks. To light up the butane burner, strike a match or use a BBQ lighter and hold it at the open firebox door while simultaneously opening the gas valve in the tender very slowly until the gas ignites. You should hear the gas coming into the burner. Make sure the burner is lit by looking in the fire door, then immediately turn on the suction fan.

A strong fire is crucial to keep the model at pressure during running. For the butane firing engine, the jet and gas line should be kept clear and checked for clogs. The factory provided jets have a slightly larger nozzle than most other jets on smaller engines.

It will take approximately several minutes to raise pressure. Once the gauge shows some pressure has built, you can shut off and remove the suction fan from the stack and then open the engine's blower valve. At this point steam will rise rapidly. When the gauge reads over 50 psi, the engine is ready to run.

Drain Cocks

This locomotive is fitted with working drain cocks on the cylinders. When first starting out, the cocks should be open (lever under smokebox at center position). This will allow water in the cylinders to drain while the cylinders heat up to working temperature. As steam enters cold cylinders, it condenses, so expect a fair amount of water to come out at the beginning of each run. Once the cylinders have warmed up, you can close the drain cocks. To close them, move the lever left or right.

Running

Move the reversing lever at the right side of the cab to the forward position. With the engine on the track, and without a train, open the throttle slowly. The engine may need to be pushed a little to overcome the steam condensing into water in the cold cylinders, but the open drain cocks will minimize this. After a few moments, the engine should take off on its own, moving away smoothly.

When the engine is running, the blower valve can be turned down or shut off but should be open whenever the engine is stopped. A train can be coupled on and the run can proceed. Since all of the locomotive's functions are controlled from the cab, it can be driven like a full-size engine, meaning that you'll have to stay with the engine through the run if you want to change its speed or direction. If you have a suitable track, the engine can be left to run on its own at a steady speed.

Keep your eye on the water glass. If the level drops lower than the top of the water gauge nut, stop the engine and use the hand pump to add water. When under pressure, the blowdown valve can be opened and closed quickly to clear out any air bubbles from the water gauge for an accurate reading.

Your locomotive may be equipped with an axle pump and bypass valve. The pump moves water from the tender to a check valve on the locomotive. The bypass valve is located on the bottom right side of the locomotive under the cab. When the bypass valve is completely shut, water is pumped into the locomotive. When the bypass valve is open, the pump will re-circulate water back into the tender. With careful adjustment of this valve, the engine will always have enough water to keep running for long periods of time until the tender water tank needs to be refilled. The tender is also equipped with the hand pump, which needs to be used to prime the axle pump. Only two or three strokes are necessary to prime the pump

Shutting down

To shut the engine down simply close the throttle valve and turn off fuel valve. Make sure the fire is completely out before turning off the steam blower if engine is standing still. This will minimize the chance of the paint getting scorched from any fire still burning in the firebox that is not vented.

The sight glass blowdown valve in the cab can be opened while there is some pressure left in the boiler to quickly remove leftover water in the boiler.

After a day's operation in the garden, you'll probably find that your engine has a coating of oil all over it. This is steam-cylinder oil that has been exhausted from the stack. A simple wipe down with a dry cloth is all that's necessary to restore the engine to pristine condition. This is best done while the engine is still warm. Wipe any grit and excess oil from the wheels and running.

Cold Weather Running

The weather can dramatically affect the performance of your locomotive. Cold and wind can decrease efficiency to a disappointing level. Butane gas becomes liquid at 32°F and will not work. As it approaches 32°F, its pressure (and effectiveness) diminishes.

The compartment in the rear tank in which the gas tank resides can be filled with warm water in cooler weather. This will warm the gas in the tank and keep its pressure up, which will cause the engine to operate in a much more lively manner, much as it does in warm weather. If the water in the tank cools, just replace it with warmer water. Empty the tender at the end of the day's run. Note: the temperature of the fuel-supply-can must always be higher than that of the engine's gas tank. If you have warmed the engine's gas tank and the supply can is cooler, gas will not transfer. **Never put hot boiling water in the compartment. This could cause dangerous pressure levels in the gas tank. The water should be comfortable enough to put your finger in.**

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