

## Operating the Bowande 14xx Tank Locomotive

### PLEASE READ THIS IMPORTANT INFORMATION FIRST

**Please keep in mind before firing this locomotive that should the locomotive stop for any unexplained reason, then it must be assumed that the boiler is out of water. Immediately turn off the gas at the control valve.**

The reason for this warning is that the boiler may be out of water and with the burner still alight, serious and permanent damage may be caused to the boiler.

**Operation of this locomotive model by persons under the age of 12 years, even with adult supervision, should be discouraged. Sudden emissions of hot, oily water and steam from the chimney may scald small hands. All users should keep their faces away from the chimney when steaming up or when starting the run.**

**This model locomotive is for operation outdoors only. Do not operate indoors particularly in enclosed or confined spaces. Unpleasant fumes, the product of incomplete combustion may be generated during the initial firing sequence.**

**This model locomotive comes with a boiler test certificate and a gas tank test certificate. Keeps these documents in a safe place. Boilers and gas tanks are made to the highest standards and comply with EU regulations.**

If you wish to run your model at some Model Engineering Clubs and at exhibitions to which the public are admitted, a test certificate may be required by the Club or exhibition organiser. The two test certificate documents supplied with this locomotive will be required by the pressure vessel tester as evidence of an initial manufacturers' test. Bowande Live Steam UK Ltd recommends the test procedure published by the Gauge One Model Railway Association. Other procedures are available.

Thank you for purchasing a Bowande 14xx. The team at Bowande Live Steam UK Ltd wish you many happy hours of pleasure with your new locomotive!

### Before steaming your 14xx Tank for the first time

#### Water, Gas and Oil

Always use good quality consumables with this model.

Water. Distilled Water is the best water to use. Rainwater is perfectly good too and a couple of buckets left out when rain is forecast will ensure a free supply. Pass the rainwater through a filter paper if you suspect dust or debris contamination. Store in a container out of sunlight or the growth of algae may occur.

Never use tap water because it will contain dissolved Calcium and Magnesium salts which over time will deposit in your boiler as limescale. There is conflicting advice about De-ionised water and for that reason I suggest distilled water or rainwater.

The Bowande 14xx has two options for filling the boiler with water during a run and while in steam. Firstly, at the top of the steam turret in the cab there is a Goodall valve sometimes also called an ENOTS valve. Using a hand pump bottle\* fitted with a hose of the correct diameter, it is possible to force water into the boiler both when cold and when under steam pressure. The alternative is to use a trackside pump or hand pump in a following vehicle, replacing the plug on the side of the steam turret with a clack valve and associated pipework. Fitting your locomotive with a hand pump system would make an interesting and useful project for any live steam enthusiast.

Oil. Use only real steam oil in the lubricator. I found regular ISO 460 steam oil\* to be good in this model. You can use the same oil to lubricate bearings and sliding surfaces to good effect.

Gas. The usual good advice for Gauge One live steam models is to use only Butane gas. I have found Butane satisfactory with the prototype model during normal weather conditions in a UK Spring and Summer. However, because there is no water jacket surrounding the gas tank of the 14xx, it may be that during the cooler winter months the flow of Butane is inadequate to maintain a good fire. In this circumstance only, it is permissible to use Butane/Propane mixes.

If you opt to use Butane/Propane mixes then be sure to monitor gas tank temperature with an un-gloved finger every now and again. If heat is detected in the tank then stop operations immediately. Because there is no heat source immediately adjacent to the gas tank, the chances of any tank heating are remote but safety first is the mantra of all live steam enthusiasts.

Gas sold in DIY supermarkets in cans for small blowtorches etc is ideal. Make sure it has a screw fitting to accept an adapter sold by live steam model railway suppliers\*.

The larger DIY cans of Butane gas are the most economic although small cigarette lighter refill canisters are adequate.

## Tools and Equipment

As will be seen from these instructions a number of tools and consumables are required.

Experienced live steamers will have these already. For those new to the hobby, items marked with an asterisk \* and listed below are required. A number of suppliers can assist. We particularly recommend Mike Darby at Chuufed2bits. <http://www.chuffed2bits.com/>

The following Tools will be needed

- Water syringe 60mls
- Small syringe for extracting condensate from lubricator after the run
- Water pump bottle fitted with hose for Goodall/ENOTS valve.
- Butane gas adapter
- Barbecue style lighter
- Clean towel for servicing loco
- Metric spanners and screwdrivers etc

Consumables

- Butane gas (Butane/Propane mix for winter use)
- Steam oil ISO 460
- Distilled water or rainwater



### Running the model

Please follow the directions below. If you are new to Gauge One Live Steam then you may find it beneficial to have a more experienced person handy to advise and encourage. There is nothing particularly difficult about steaming-up and running this locomotive, however an experienced person nearby will give confidence until the routine is mastered.

1. Oiling up the model. Invert the model on a clean towel. Using steam oil place a single drop of oil on all bearing and sliding surfaces. Rotate the wheels to ensure a good cover. Wipe off any surplus with a rag.



2. Using the same steam oil, fill the lubricator (A) with oil leaving a little headroom in the tank to permit the displacement principle to operate. The lubricator is located in the LH dummy water tank under a lifting lid.

3. Fill the boiler with water. Remove the Goodall/ENOTS valve (F) located at the top of the steam dome in the cab. Turn the valve anti-clockwise. Fill the boiler using a large (60ml) syringe\*. Leave

a little headroom at the top of the boiler by drawing back the last 10 -15mls. Replace the valve. When refitting the Goodall/ENOT Valve do not overtighten - finger tight, where the sealing O ring is slightly compressed, is fine.

4. Now fill the gas tank in the bunker of the locomotive. If using a DIY store canister of gas first fit the adapter\*. Now invert the can and engage the tip of the adapter firmly and squarely onto the gas inlet valve (B) on the model's gas tank. Hold the model steady with the free hand. After 20 seconds or so, gas will spit from the inlet valve. Remove the supply. The loco is now ready to go.

**NB.. Please ensure that when filling the loco's gas tank, that other live steam models and naked flames are far away. It is inevitable that some gas will be spilt and since butane and propane are heavier than air, the spilt gas may collect on the track. A passing live steam model may ignite the spilt gas and a spectacular but highly dangerous flare-up may occur. Fuelling your locomotive well away from others is a very good and safe practice and should always be observed.**

5. Place the loco on the track. Ensure the regulator (D) is closed with lever in the fully anti-clockwise position. Open the smokebox door and have a barbeque or similar lighter\* ready. Gently open the loco's gas control valve (C) until the hissing sound of gas can just be heard. Operate the lighter in the smokebox and the gas will light with a pop and the hissing note change to a gentle low roar. Close the smokebox door and adjust the fire. A gentle fire is always best. Over enthusiastic firing will ensure the smokebox gets overheated while the water in the boiler is inadequately warmed! As the initial heating proceeds some adjustment of gas flow may be needed. Remember that less is more.

6. After 6 or 7 minutes a pressure of 30 to 40psi should be seen on the pressure gauge (E). Set the quadrant lever (H) in the cab (by gently easing slightly the lever to the left) either fully forward until the 'notch' is detected or fully reverse to the notch. Now gently push the loco in the chosen direction of travel whilst gently opening the regulator (D). Hot oily water and steam will be expelled from the chimney. Keep your face away from this area. After a yard or two of gentle pushing, all condensate should be ejected from the chimney and the loco will start to pull away unaided. If the wheels lock, then close the regulator but continue to push the loco in the direction of travel. Jerky loco movements will calm into steady running. After a lap of the circuit and the model should be ready to go. Couple the train and enjoy the run.

7. It has been found that steady running at scale speeds can be achieved by careful adjustment of gas control valve and regulator. The continuous blowing-off at the Safety Valve wastes steam, so keep gas flow sufficiently low to keep the loco running steadily. Use the regulator to control the speed. When the model is run-in and the control technique learnt, much pleasure will be derived from running and controlling your model in a prototypical and economical way

8. Regularly check the water gauge to ensure there is sufficient water in the boiler to keep the firebox covered. After 5 minutes running use the Goodall/ENOTS valve and a pump water bottle\* to top-up the boiler. Again observe the water gauge but it is quite OK to keep pumping water until water spits from the Safety Valve! Pumping cold water into the boiler will lower the boiler pressure so leave the loco to return to pressure before restarting. Watch out for any hot water and steam emitted from the chimney on restarting.

9 . With time and experience it should be possible to get as much as 10 minutes running between pump-ups. However, gas supply will be exhausted after 20-25 minutes running. Refilling the gas tank after say 15 minutes from the start should permit a satisfying 30+ minute run. Oil should last for 40+ minutes.

After the Run

When running is over for the day, allow the loco to cool having closed the gas tank valve. The regulator should also be closed and when the loco has cooled a little, the condensate in the oil tank can be removed with a small syringe\* and the tank refilled with clean oil. Clean the outside of your model with a rag to remove oil that will have been ejected from the chimney. If the model is to be set aside then remove both the Safety Valve and Goodall/ENOTS valve and shake the inverted loco over the sink to expel all the water. Refit the two valves. Check the tightness of all nuts and bolts etc. Give the model a visual check to ensure no parts have been accidentally damaged during the running session.

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