OPERATING INSTRUCTIONS

Accucraft Victorian Railways ‘NA’ Class 2-6-2T

Argyle Locomotive Works Pty Ltd. Australia

14 Mar 2025

Locomotive '1A'

Safety First

1. Please read all the instructions thoroughly before running for the first time.
2. Do not pick up the engine by the bodywork, chimney or boiler, especially when hot. Only pick up the engine by the buffer beams and when hot, use gloves or a cloth.
3. Avoid positioning your face directly over the model as steam and hot water may be released from the stack or safety valve unexpectedly.
4. The firing system has been designed to use Butane gas only. Do not use any other gas (including propane or butane/propane mix).
5. Always refuel the engine in a well-ventilated area and away from ignition sources including other working live-steam models. The fuel filling system allows a small amount of gas to vent off as the fuel tank is being filled. A passing engine can ignite this bleed-off gas, causing a potentially hazardous situation
   and **No Smoking**. Butane gas is heavier than air so may settle into any depressions within, below or around the model. After fuelling, blow around the model to disperse any residual gas that may have ‘puddled’ under or around it.
6. As in full size locomotive practice, the fire and the water within the model must be monitored for safe operation.
7. Make sure the fire remains within the fire tube.
8. The boiler must be full to the correct level before starting a run.
9. The gas may outlast the water.
10. Should the boiler water run low, extinguish the fire immediately and let the boiler cool <u>before</u> adding water.
11. The model should only be handled or operated by an adult who is familiar with the model and it’s functioning, who fully appreciates all the Hazards associated with it and who has the knowledge and the ability to minimise the Risks involved in its operation.

Introduction

Accucraft first produced the 'NA' model in 2014.
The 2025 production is an entirely new build with many improvements in both manufacture and features. This handbook is for the 2025 production and covers models of the preserved locomotives (6A, 7A, 8A, 12A, & 14A) and '1A', the first of the class delivered in 1898.
'1A' represents the original Baldwin build, as it was delivered to the Victorian Railways and is without the various modifications developed by the VR for its Australian operations.

Unpacking and preparing the engine

The following items will need to be fitted after unpacking the model.

A. The electric generator exhaust pipe*.
B. The 'Sanding rods. These are the fine wires that run from the cab front to the two smaller domes.
C. The dummy whistle, safety valves and the whistle pull wire. To fit these items, unscrew the cap from the top of the dome, install the dummy whistle first, then the safety valves and reassemble the dome. Connect the Whistle pull wire.

*If the cab roof strikes the generator exhaust pipe, the generator can be reversed on its mountings to clear the cab roof.

Tool Kit

The following items are recommended for operating your model.

Tools
- Syringe - large for water
- Syringe - small for steam oil
- Gas stove lighter
- Water top up bottle
- Gas filling adaptor
- Cotton gloves

Consumables
- Distilled Water
- Butane Gas
- Steam Oil Grade 460
- Auto Oil

Guage adjustment

The model comes set for 45mm (gauge 1). To change to 32mm (O gauge) the main driving wheels can be moved in on the axles by loosening the set screws in the wheel boss and resecuring them in the inner axle detents. The model comes with a set of 32mm gauge wheels for the pony trucks. Using a small Phillips head (cross point) screwdriver loosen the axle saddles on the pony truck to exchange for the smaller gauge wheel sets.

Lubrication

External Moving Parts.
A high-grade auto oil can be used to lubricate all the external moving parts, including wheel bearings. A single drop of oil on each moving joint is all that is needed. Check the lubrication after several runs and reapply as necessary.

Internal Moving Parts.

The internal moving parts inside the cylinders and valve chests are lubricated with **Steam Cylinder Oil Grade 460**. It is essential that you only use approved Steam Oil for the internal lubrication of your model. Using mineral based (auto oil) will clog the steam pipes and damage your model.

The lubricator is located inside the cab on the RHS between the Reversing lever and the cab window. Unscrew the T bar cap to access the oil chamber. Fill the lubricator to the top of the steam pipe that passes through it. This will allow a small air space between the oil and the cap.

How the lubricator works.

As the steam passes through it, a small amount will condense into water. The water sinks to the bottom of the lubricator, forcing a similar quantity of oil into the steam line and thus to the cylinders. With time all the oil will be replaced with condensed water, so it needs to be drained and refilled after each 1/2 hour of operation.
Beneath the cab floor on the RHS of the engine are two valves with actuating handles. The rearmost valve is the lubricator drain. Be sure the lubricator drain is closed and sealed before refilling it.

Draining the lubricator of water can be done in several ways.

- Remove the lubricator's cap and draw out any water from the previous run with a syringe that reaches to the bottom of the lubricator.
- After a run while there is still pressure in the boiler, crack open the regulator and open the lubricator drain valve to blow out the contents of the lubricator.
- Remove the lubricator cap and open the drain valve until all water has drained.

Gas

Your model burns butane gas. The gas tank is located inside the cab on the left-hand side. Butane gas can be purchased at most hardware stores as camping stove fuel or as cigarette-lighter refills. Depending on the type of refill canister you are using you may require a special adaptor to transfer the gas to the model. To fill with gas, invert the gas can over the filler valve atop the tank and press down. firmly. Support the model with your other hand while doing this. Make sure that the gas regulator valve is closed. 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 liquid gas will flow from the valve.

Butane gas is heavier than air so may settle into any depressions within, below or around the model. After fuelling, blow in and around the model to disperse any residual gas that may have 'puddled' around it.

Water

Use only distilled water in your engine's boiler. Tap water contains minerals that will be deposited within the boiler and steam pipes and ultimately affect the performance of the engine. Avoid using de-ionized water, it can cause long term problems by slowly removing zinc from the brass fittings.

Filling the boiler before lighting up.

The filler plug inside the cab has two functions.

1. Filling the boiler before lighting up.
2. Replenishing water when the loco is in steam.

Be sure there is no residual pressure within the boiler before removing the filler plug.

Unscrew the filler plug and fill the boiler to the top with water, then using the large syringe provided withdraw 40 mil of water to allow a steam accumulation space above the water. Replace the filler plug.

Replenishing water when the loco is in steam.

The 'Goodall Valve' within the water fill plug allows you to fill the boiler while the loco is in steam. A water 'top up bottle' with a 4mm pipe is used to pump water into the boiler against boiler pressure. Use the gauge glass to monitor the water level within the boiler. The accuracy of the water gauge glass may be affected by air bubbles and capillary action. To get a more accurate reading from the gauge glass the model is fitted with gauge glass 'blow down' valve. It is beneath the cab floor on the RHS of the engine are two valves with actuating handles. The front valve is the gauge glass blow down. Opening it momentarily will clear the gauge glass of bubbles to give a clearer indication of water level within the boiler.

Lighting Up

Make sure the throttle is closed, and the model is in mid gear.
Open the hinged smokebox door at the front of the engine and you will be able to see the flue. To light up, use a gas lighter and hold it at the open smokebox then open the gas valve slowly until the gas ignites. The fire should flash back with a "pop" and burn inside the fire tube at the back of the boiler. Opening the valve too much may blow out the flame or cause the fire to burn inside the smokebox. If it wants to burn in the smokebox or in the forward part of the flue, slowly close the gas valve until it flashes back to the burner. Do not allow the fire to burn in the smokebox, it will damage your model.

The fire can be observed by carefully looking inside the smoke box from a safe distance. The fire should burn under the burner in a crescent-shaped flame, which should be clearly visible through the smokebox door. The flame should be bright blue and should burn steadily. In some circumstances the flame may be a little unstable until the model starts to warm up, we recommend leaving the smoke box door open until the loco is warm and steam is raised.

After a few minutes you should start to notice the pressure registering on the pressure gauge. The safety valve is under the steam dome (the middle dome). It has been set at the factory to release at 60 pounds per square inch steam pressure. When the pressure on the gauge reaches 40psi, the engine can be run.

Running

Running In

All locomotives are test run before leaving the factory, but they will still require a certain amount of running in when new.

Duration

With the boiler filled with cold water and a full gas tank your model will typically operate as follows

- Raise Steam: 5 minutes.
- Running Time: up to 30* minutes
- Check the water level using the Gauge Glass every 5 to 10 minutes.
- Maintain the water in the boiler to above half in the gauge glass.

*Run duration will vary according to conditions, the load, gas setting and steam production.

Cylinder Drain Cocks.

Your model is fitted with operating cylinder drain cocks. Their function is to drain water from the cylinders and to warm them before setting off.
The drain cocks are operated from the flat lever on the LHS under the smoke box saddle, just in front of the cylinder. Moving it fully forward or fully backward opens the drains; Mid position closes them.
Prior to moving off, select forward or backward gear on the reversing quadrant and crack open the steam regulator. Allow the loco to move a small distance so that all the ports are allowed to drain. Initially water will be ejected but as the cylinders warm less water and more steam will be released. When ready, close the drain cocks. The loco is now ready to proceed.

Cylinder Drain Cocks Actuator Lever

'Notching up'

'Notching up' is the practice of reducing the amount of steam admitted to the cylinders by the valve gear. Moving the reversing quadrant arm ('Johnson Bar') a notch towards mid gear causes the valves to close earlier admitting less steam on each stroke and allowing the steam to expand within the cylinder rather than in the exhaust. Full size locos use this practice when the engine is crushing and requiring less power. It conserves both steam and fuel. You can try notching up your engine but as the boiler pressure in this scale is much less there is less capacity for the steam to expand within the cylinders.

Johnson Bar Over Travel

The JB may be capable of travelling beyond the last detent on the quadrant in either direction. Operating in this configuration may cause the Expansion Links to move beyond their designed operating position. Evidence of JB overtravel is felt by a severe knock back when the JB is moved beyond the correct operating range.
Models fitted with remote control will need to be adjusted to prevent JB overtravel.

Driving

Boiler Management

Remember that you are both the Fireman and the Driver. Operating the model also means managing the fire and maintaining the correct boiler water level.

As the engine warms up, so does the gas tank. This will cause the fire to become more intense and will need to be turned down. The fire should be audible but not roaring. Too much fire will waste gas and increase water consumption. The fire should just be sufficient to provide enough steam to operate the train. Excessive blowing off at the safety valve is a sign of too much fire. Best running is achieved after several minutes when the water level has fallen slightly giving additional space for steam accumulation within the boiler.

Shutting Down

To shut the engine down, simply close the gas valve to extinguish the fire. Once the fire is extinguished keep the steam regulator closed to prevent oil being sucked into the boiler by condensing steam.

Servicing a Hot Engine

After a full run, a complete Gas, Oil and Water service needs to be carried out. Be sure the gas valve is closed, and the fire has been extinguished. Before attempting to remove the boiler fill plug be sure that there is no residual pressure in the boiler. It can be difficult transferring gas from a cool refill canister to a warm engine. This is especially so in cooler weather. This is because the pressure in the loco gas tank is higher than in the refill canister. This can be overcome by warming the gas canister in a bath of warm water prior to filling. (max temperature 35 deg C)

Blocked Gas Jet

Gas fired models may occasionally suffer from a blocked gas jet. If you have difficulty raising steam or the model is lacking performance this may be due to a blocked gas jet. If this is the case, then the jet will need to be cleaned.

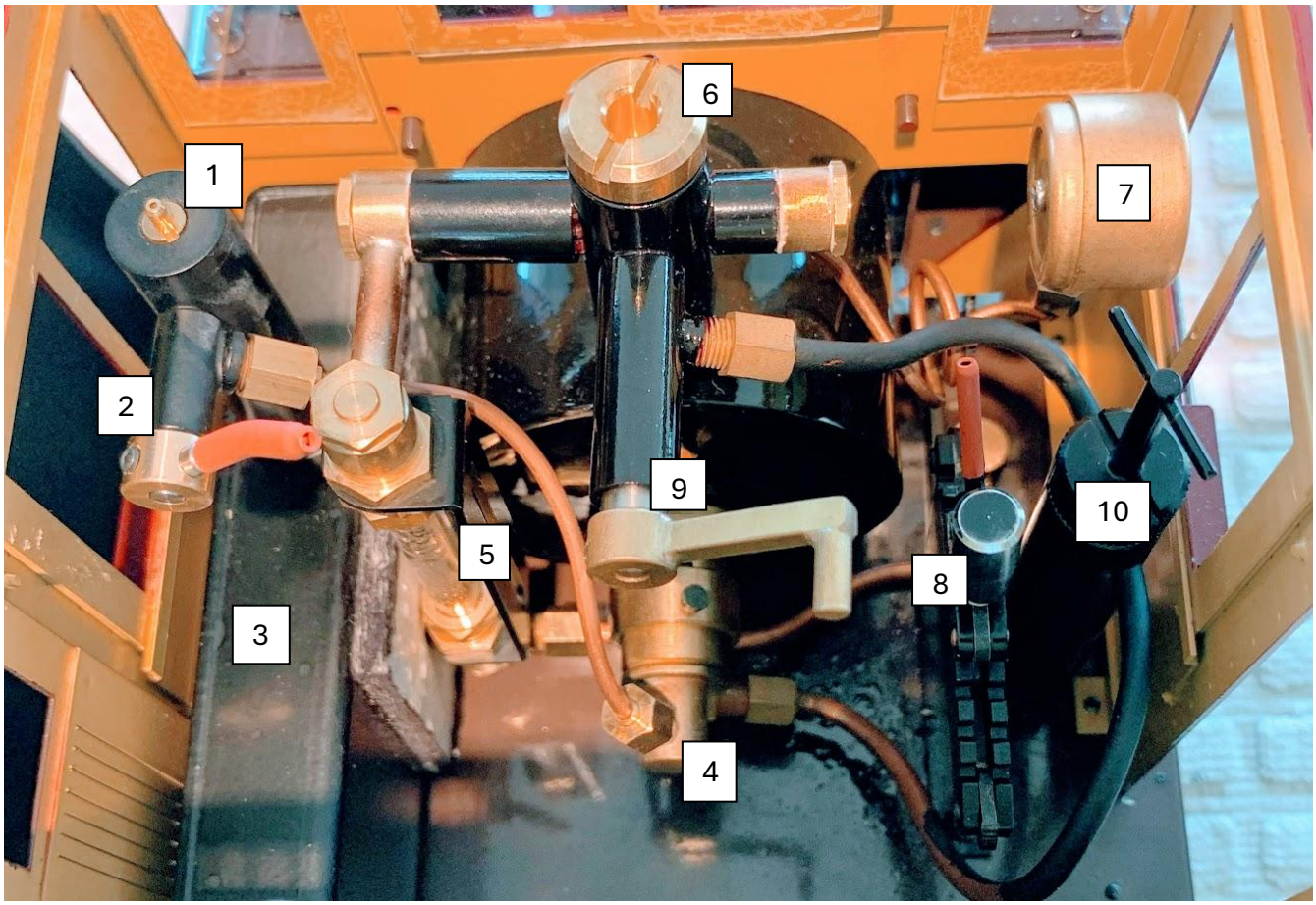
Procedure:

Close the gas valve. Using a 6mm spanner undo the nut securing the small copper gas pipe to the gas control valve. Once this is free, the gas pipe can be manipulated gently to allow the gas jet to be wiggled free of the burner tube at the back of the boiler. Once free of the loco, carefully unscrewed the gas jet from the jet holder. Hold the jet backwards against a gas can and force gas through it. With good eyesight the jet can be held up to a bright light to see if it is clear.
Under no circumstances use a pricker wire or any mechanical device to clear the jet.
Reassemble the jet into the holder then insert it into the burner tube and reconnect the feed pipe to the gas regulator. Take care to securely tighten all screwed fittings BUT not to overtighten them. A small amount of thread sealer can be used between the jet and the holder but do not allow any to enter the gas path or this will result in another blocked jet.

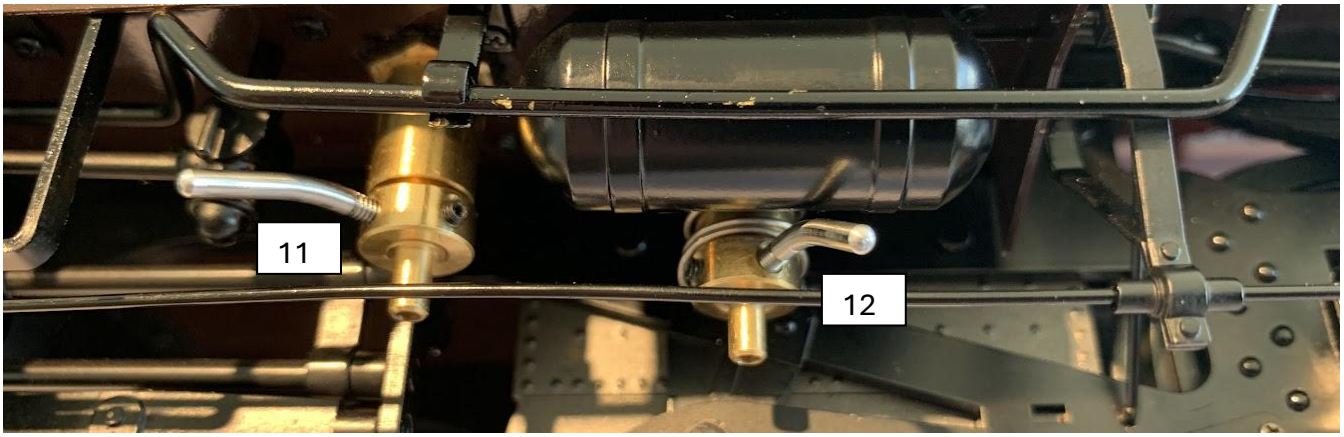
Technical Specifications

• Scale: 16mm to 1 foot (1:19) • Length over buffer beams: 450mm (17.7”) • Width: 135mm (5.3”) • Height: 180mm (7.1”) • Weight: 6.6kg (14.6 lbs) • Min Radius: 1.2m (4’) • Gauge: 45mm or 32mm (adjustable) • Sprung axles	• Boiler: Centre Flue • Fuel: Butane Gas • Working Pressure: 60 psi • Valve Gear: Slide Valves with full working Stephenson Valve Gear • Cylinder drain cocks. • Boiler Fittings: Safety valve, pressure gauge, water level glass with blow down.

Controls & Fittings

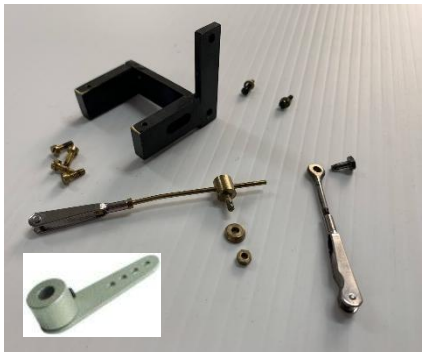


1. Gas Fill Valve	7. Pressure Guage
2. Gas Regulator	8. Reversing Lever (Johnson Bar)
3. Gas Tank	9. Steam Regulator
4. Gas Jet	10. Displacement Lubricator
5. Water Gauge Glass	11. Lubricator Drain Valve
6. Boiler Water Fill Plug & ‘Goodall’ Valve	12. Water Gauge Glass Blow Down Valve



Accessories

The following accessories are available* to enhance your model.
* Subject to availability.



RC Mechanical Fittings Kit

Mechanical mounting and connecting links for RC servos.

- Servo mounting block, 2 x mounting bolts & 4 x Servo securing screws.
- Steam regulator linkage with adjustable pivot, collar & nut.
- Adjustable reversing linkage with shoulder bolt
- Replacement regulator handle. AP24-141

RC Electronics Kit

- FOSWORKS Tx3.1 OMNI Handset and FRX23 H OMNI Receiver
- Hitec metal gear servos (Qty 2)
- Hitec Switch Harness with Charging Cord
- Rechargeable Eneloop 4.8v NiMH Flat Battery with JR Lead
- Ultra Power AC Charger with Charge Leads

Small Pilot Headlamp

As fitted to 6A and 7A. (Set of two)

Side Marker Lamps

The Side Marker Lamps mount on the existing lamp hooks.
Qty 2 attach to the front beam and two on the rear tank. (Set of Four)

Tapered “Stovepipe” Chimney

As fitted to locomotive 8A. The conventional chimney is removable to allow the tapered chimney to be fitted.

Historical Supplement

By David Fletcher

History

The Victorian Railways (Australia) 'NA' class 2-6-2 tank locomotives were built to serve the 4 narrow gauge 2' 6" (762 mm) gauge branch lines in that state. Baldwin Locomotive Works in the United States supplied the first two 2-6-2 tank locomotives in 1898 as well as parts for a further two locos.
The original Baldwin Classification for the simple version of the VR 2-6-2 was: 10-20 1/4D Drawing 1 being the first design of this class. The Victorian Railways Newport workshops assembled the parts supplied by Baldwin to give an additional two locos, and subsequently built a further 13 locomotives. The last one, number 17, was built in 1915. The locomotives weigh 36 tons (36.58 t) and produce a tractive effort of 12,170 lbf (54.1 kN), allowing them to haul loads of 90 tons (91.44 t) up grades of 1 in 30.

Preservation

Two of the original 2'6" narrow gauge lines have been preserved -
Puffing Billy Railway. The 24km (15 miles) of restored line between Belgrave and Gembrook in the scenic Dandenong Ranges 50 km east of Melbourne. NA class locomotive numbers 6A, 7A, 8A, 12A, and 14A have been restored and operate on the 'Puffing Billy' Steam Railway. No. 3A is also preserved awaiting restoration.
Walhalla Goldfields Railway. In South East Victoria's Gippsland alpine region, the train journeys from the historic gold mining town of Walhalla and follows Stringer's Creek to where it joins the Thomson River, it then crosses the spectacular Thomson River Bridge to arrive at Thomson Station.

Liveries

The liveries of the NA class locomotive are a significant historical and aesthetic element of the design. In brief summary, the NA class sported liveries in the time periods as follows:

1898 - 1900	Light Ivy Green and Gold, style 292 of the Baldwin Locomotive
1900 - 1903	Victorian Railways Two-Tone Green with white lining (3A - 6A)
1903 - 1921	Victorian Railways Canadian Pacific Red, Chocolate trim and white lining (7A-17A)
1921 onward	Plain black livery through to preservation in 1953

Light Ivy Green and Gold

The first two NA class 2-6-2Ts delivered by the Baldwin works in Philadelphia were painted to a livery standard, known as the Baldwin 'Book of Styles'. It was common for US and UK builders to provide new locomotives using works livery, rather than the specific corporate livery of the purchasing railway unless specifically requested of the builder. The two Baldwin built NA class locomotives were delivered in 'Light Ivy Green and gold, Style 292' livery. This was a Baldwin stock export livery of single green finish, lined with gold and red 'shadow line'. The green paint finish was used extensively on the locomotive, including the chassis bar frames and cranks. Baldwin's Ivy Green Style 292 had been extensively used on exports to South America since 1885. It is unknown whether the Victorian railways made any specific requests regarding the paint and decoration; however, this livery would not have looked unusual in relation to the two tone green scheme then used by the Victorian Railways as their standard.

The Argyle Locomotive Works NA class model of '1A' is painted in the 'Light Ivy Green and gold, Style 292' livery.

VR Two-Tone Green

The standard Victorian Railways livery of two-tone green with white lining was applied to the first two NA class built at the Victorian Railways workshops in 1900. The origin of the two-tone green livery is unknown; however, it probably evolved out of the many two-tone green schemes provided by UK builders through the 1880s and 1890s. Notably Baldwin records for other locomotive exports reveal the two- tone green scheme and white lining to be similar to that used by the Great Central Railway UK at that time. The Victorian Railways appears to have standardized on this livery around the mid 1890s and retained the scheme through to 1903. All the Victorian built NA class from 1900 and 1901 (3A-6A) were finished with the scheme and later even the two original Baldwin examples were so painted. According to the Heritage Manual utilized at the Puffing Billy Railway today, the two green colours are best matched to British Standard 381c Colours - B225 Light Brunswick Green and BS227 Dark Brunswick Green. The BS381c standard dates to 1931 and captures typical pre-mixed paint formula through the Victorian and Edwardian era, as used in Architecture, railway, carriage and other transport and agricultural equipment.

The Argyle locomotive Works NA class model depicted in VR two-tone green is based on the Heritage Manual and BS381c paint standard, reflective of the locomotive livery from 1900-1903 as well as key locomotives in preservation today.

VR Canadian Pacific Red

With the appointment of Thomas Tait as Chairman of Commissioners for the Victorian Railways in 1903 the two-tone green livery was abandoned. Thomas Tait had come from a successful career with the Canadian Pacific Railroad as their Assistant General Manager. His time at the Victorian Railways was relative short, resigning his commission in 1911 and returning to Canada. However, he left his mark, notably with significant re-organisation of the Victorian Railways, application of electrification, introduction of the electric 'Tait' trains and the application of the 'Canadian Pacific Red' on the locomotive fleet. To be sure, the locomotive fleet was not painted in the Canadian Pacific Livery; the livery style remained similar in concept to the previous VR two-tone green scheme, but the greens were replaced with Canadian Pacific Red and Chocolate Brown. The white line work remained relatively unchanged. The Heritage Manuals for the Puffing Billy Railway recommend colour BS540 'Crimson' approximating Canadian Pacific Red and BS412 Dark Brown for the Chocolate brown trim. The Canadian Pacific Red scheme would remain the standard livery for the VR from 1903 through to 1921, including the NA class locomotives. Notably all new NA class built from 7A onward (1905) were out-shopped in this livery, with all existing NA class repainted shortly after 1903.

The NA class model offered by Argyle Locomotive Works is based on this Heritage paint advice and the use of the BS381c colours. Of note however is that the deep red painted NA locomotives of 2013 at Belgrave are painted in a deep maroon, rather than the British Standard colour advised for CPR red. The Argyle model more closely reflects the Canadian Pacific Red from the Puffing Billy Heritage manual which is closer to period examples such as heritage railway models.

Fade to Black

With the appoint of Tait's Prodigy, Harold Clapp, to Chairman of the Victorian Railways Commissioners in 1919, changes were again made and the locomotive stock repainted to plain gloss black from around 1921 onward. The plain black livery would remain in service through to preservation in 1953.

The plain black offering by Argyle Locomotive Works represents the NA class livery from 1921 onward as well as in preservation.

Further Reading

'The Narrow Gauge' by Nick Anchen, tells the story of the Whitfield, Gembrook, Crowes and Walhalla railways, from construction right through to closure, and the eventual re-birth of the Puffing Billy and Walhalla Goldfields Railways.
ISBN: 978-0-9807640-3-1 www.sierraaustralia.com/the-narrow-gauge.html