

BRITISH RAILWAYS STANDARD 9F 2-10-0



Contents

Introduction	3
Features	4
Control Modes	6
Performance Options.....	6
Driving Controls	7
Driving in Advanced Mode.....	17
Locomotive Numbering	19
Modification Policy	21
Acknowledgements.....	22
Appendix: Head codes	23



Introduction

Thank you for purchasing the British Railways Standard 9F 2-10-0 Add-on for Train Simulator.

We are proud to present all 221 members with standard boilers which were in use from 1954 until 1968 and then right up to current day preserved versions.

As usual with our engines they come in simple, basic and advanced driving modes and can be driven using the F4 HUD, keyboard, mouse and/or X-Box or Steam controller.

Please read this manual thoroughly, especially to help to get the best from Advanced Mode.

All the best,
Victory Works

Click on the links below to read about future projects, see Work in Progress pictures and read more about the research, detail and passion that we put into our Train Simulator add-ons.



Features

- Simple, standard and advanced driving modes
- Xbox controller support *SIMPLE AND STANDARD MODES ONLY*

- BR Standard 9F 2-10-0 Locomotive
 - British Railways 1953-56 Livery
 - Single Chimney
 - Double Chimney
 - Consett Airpumps (fitted)
 - Lickey Banker (92079)
 - All above as Clean and Dirty
 - British Railways 1956-68 Livery
 - Single Chimney
 - Double Chimney
 - Consett Airpumps (fitted)
 - Consett Airpumps (removed)
 - Lickey Banker (92079)
 - Giesel Chimney
 - Mechanical Stoker
 - All above as Clean and Dirty
 - 92167 (last in class) running as a 2-8-0
 - Preserved Liveries
 - 92220 Evening Star
 - 92203 Black Prince
 - Lined Black
 - Unlined Black
 - 92214
 - Lined Black
 - Unlined Black
 - Lined Green (with names)
 - BR Tenders
 - BR 1B
 - BR 1C
 - BR 1F
 - BR 1G
 - BR 1K (Mechanical Stoker)
- Numerous optional parts and fittings for each livery

- Compatibility with the [Victory Works Number Generator](#) software for easy set up
- Custom sound sets inside and out
- Realistic cab with multiple views, including dual “head out” and fully modelled firebox and coal
- Realistic wheel slip physics and effects *ADVANCED MODE ONLY*
- Simulated steam chest *ADVANCED MODE ONLY*
- Realistic types of braking including steam, air and vacuum *ADVANCED MODE ONLY*
- Cylinder cock management *ADVANCED MODE ONLY*
- Boiler management with priming possible *ADVANCED MODE ONLY*
- Realistic injector control *ADVANCED MODE ONLY*
- Realistic “by the shovel” stoking with synchronised sound *ADVANCED MODE ONLY*
- Dynamic steam and smoke colour and quantity
- Realistic boiler water gauges effected by gradient, acceleration and speed
- Opening windows (with rain effects) and roof hatch
- Dynamic lamp setting
- Cab light effects including flickering firebox glow
- Atmospheric AI effects

- Rolling Stock
 - 35 ton Class A Tank Wagon
 - Black
 - Water only
 - 35 ton Class B Tank Wagon
 - Black
 - Esso (Black)
 - With painted logo
 - With logo plate
 - Esso (White)
 - With logo plate
 - Ex-Esso without logo plate
 - Regent
 - Texaco

- 44 Quick Drive consists
- 3 scenarios

Control Modes

There are 3 ways to drive the 9F locomotive.

Simple Mode

This is selected using the menu in Train Simulator and provides a simple stop/go, forwards/backwards set of controls via the simulators built in HUD.

Standard Mode

This is the default mode if you choose to drive in Expert mode using the Train Simulator menu. The locomotive will operate with more complex controls and can be driven using the F4 HUD or an Xbox controller.

Advanced Mode

This is an advanced mode for those who want a more realistic experience and introduces features such as condensed water in the cylinders, overflowing the boiler, realistic wheel slip and simulated steam chest and brake reservoirs. To achieve these extra functions use of a keyboard is required, although this can be used in conjunction with mouse operation or the F4 HUD.

To turn on Advanced Mode you can press Control A at any time and this will also turn it off again.

The **Advanced Mode** features are shown below for each control.

Performance Options

Based on feedback we have received on previous products we have added an option to turn off the additional shadow-casting light that is activated when the firebox door is opened. This can improve performance if you find a large FPS drop when opening the firebox. It does not affect the main firebox light, just the additional ambient one.

The light is on by default but you can toggle it off/on using Ctrl-L.

Driving Controls

Listed below are the controls available when driving the 9F locomotive in standard and advanced modes.

Also see the following section, “Driving in Advanced Mode” for additional information.

1. Regulator

This controls the amount of steam allowed into the cylinders, hence directly controlling the speed in conjunction with the reverser.

Keys: A,D

Advanced Mode

In advanced mode the locomotive steam chest is simulated. This will add a delay and smoothing to the increase and decrease of the regulators power to simulate steam moving through the locomotives pipes and valves. Please note that the F5 HUD regulator value will not reflect the actual position of the in-cab regulator but the value used to simulate the chest.

2. Reverser

It is usual to start with the reverser set at 75 percent cut-off (full). As you pick up speed you reduce the cut-off, thereby allowing economic driving as well as good speed whilst hauling a load.

Keys: W, S

Advanced Mode

To move the reverser requires the lock to be taken off. To do this, press and hold the E key on the keyboard, move the reverser to the required position, and then release the lock (let go of the E key).

Keys: E

3. Cylinder Cocks

Advanced Mode

When a locomotive sits static for any amount of time, water condensation builds up in the cylinders. Thus when the piston is in motion, and because water does not compress, the cylinder will explode. The cylinder cocks are designed to expel this condensed water and should be opened for at least 4 turns of the locomotive wheels when the locomotive sets off after being stationary for some time.

The amount of stationary time varies depending on the time of day (the assumption that most steam locomotives were working from early in the morning) and also the weather. If you stop for more than a couple of minutes it is safer to open them for a few wheel rotations just to be sure. Always ensure they are open when first setting off in a scenario.

Key: C

4. Firebox

Ensure the firebox door is fully open to allow maximum stoking. A related tool is the shovel on the tender. When the firebox door is open, pull the shovel down to regulate the input of coal into the firebox.

Key: F

Keys: R, Shift R (stoking)

Advanced Mode

In advanced mode the 9F features realistic stoking by the shovelful. As default in Train Simulator coal is slowly trickled into the firebox at a steady rate. In reality coal is thrown into the firebox by the shovelful and in Advanced mode this is the case for this locomotive as well. The shovel still controls the amount of coal although this now varies from approximately half a shovelful to a loaded shovelful.

However with this comes the chance to tire out your fireman! Should you force him to shovel too much in too short a time he will gradually slow down between each shovelful and finally stop shovelling completely.

The sound of the shovel is fully synchronised to the actual coal going into the firebox so you will be able to tell if he is slowing down. If he stops completely you will be shown a message to that effect and will receive another when he has recovered enough to continue.

As an additional tool for those who like to drive with minimal or no HUD display the firebox and coal is fully modelled with a specific cab view for checking the fire mass.

The coal level is slightly exaggerated over its working range so it can be used as a visual indicator of when firing is needed. The coal level rises and falls gradually but the images below will help in visualising how this can help.

Coal level low < 30% 697 lbs

The grate can be clearly seen with a very small amount of coal.

Coal level average 55% 1277 lbs

The grate is covered.

Coal level high > 80% 1857 lbs

The grate is deeply covered with the coal white hot.

The shovel on the tender controls the stoking amount. Pulled fully down, stoking is at maximum.

5. Blower and Boiler Pressure Gauge

The most useful application of the blower is when the regulator is at idle. Since there is no throughput of steam when at idle, air flow is minimised and therefore the fire loses heat. In some circumstances (such as when the safety valve is going off) this is acceptable but if you need to get some pressure into the boiler while the regulator is closed then fully opening the blower will force air over the fire, increasing temperature and then boiler pressure. It is good practice to turn off the blower again when you open the regulator to save on unnecessary steam usage.

Keys: N, Shift N

The boiler runs best at around 220 psi. At 223 psi the first safety valve will open and the excess steam will vent quickly and noisily. If the boiler is still continuing to gain pressure a second larger valve will open at 225 psi. Both valves close again when the boiler is under 220 psi.

6. Damper

Another tool related to the firebox. This helps control the heat of the firebox, closing it will reduce the air flow through the fire, thereby lowering heat and steam production. Opening it will allow more air in, hence producing more heat and steam.

The damper has 3 notches: closed, half and full.

Keys: M, Shift M

Advanced Mode

In addition to the dampers you can increase the amount of air entering the firebox by opening the firebox door.

7. Driver's and Fireman's Injector steam

This takes steam from the boiler and uses it to blast water from the tender into the boiler.

Key: I, Shift I / O, Shift O

Advanced Mode

In Advanced mode the regulator also needs to be open to provide steam flow for the Fireman's (exhaust) injector. If the regulator is closed then use the Driver's (live) injector instead.

8. Driver's and Fireman's water taps

These are used to adjust the flow of water for the appropriate injector control.

Keys: K, Shift K / L, Shift L

Advanced Mode

In Advanced Mode you will need to operate the injectors as the real thing and balance the water and steam to use them properly.

The correct procedure is as follows – for either injector use the appropriately named controls:

1. Fully open the water control tap.

- You will hear and see water coming from under the left or right hand side of the cab.
2. Turn the injector steam lever until you hear the injector start working.
 - If you hear a hiss and see a jet of steam under the cab you have too much steam pressure and the water is not entering the injector.
 - If you hear running water and see water running from the pipe under the cab you need more steam to force it into the boiler.

Note: There are also water shut off taps on the tender on the respective sides.

9. Boiler Gauge Glasses

Attached to the boiler are strong glass tubes indicating the current level of water in the boiler. If this reaches the bottom then the fusible plugs will melt and relieve the boiler pressure whilst providing a warning to the locomotive crew.

The water level is not static when the locomotive is in motion and will wobble around appropriately. It is also affected by gradients, acceleration and deceleration.

Overfilling the boiler past 102% will cause priming and water will be ejected from the chimney.

Advanced Mode

Overfilling the boiler (past 110%) at high pressure can force water into the cylinders and cause the same problems as having condensed water from standing still. Also at this point the regulator can become flooded and be unable to close! If you overfill the boiler open the cylinder cocks immediately and leave them open until the water level in the glass falls.

You can also shut off the gauge glasses by pulling the side levers down.

10. Brakes and Brake Pressure Gauges

In basic mode the brakes are controlled by the train brake lever.

Keys: ' (apostrophe), ; (semicolon)

Advanced Mode

Train and Engine Brakes

Keys: ' (apostrophe), ; (semicolon), P, Shift-P, J, Shift-J

The 9F engine brake is operated by switching to the engine brake using the HUD button as highlighted below.



Keys: [,]

IMPORTANT: MAKE SURE to release all brakes the first time when starting. If you enter a train and after releasing the vacuum brake (pressure equalised according to the vacuum brake dial) but you find that the train won't move (the HUD still shows 0") then you need to release the engine brake as well.

IMPORTANT: Note that in Advanced Mode the F4/F5 HUD brake pressure may NOT be representative of the engines brake gauges and you should use the gauges in the cab to operate the engine correctly. Please also note that the setting of the lamp head codes is now CRITICAL to the operation of the brakes so that the engine knows how much of the train is made up of fitted (vacuum braked) rolling stock.

Vacuum and air brakes operate by having a pressure difference between a "train pipe" and a "reservoir". When the train pipe is less than the reservoir then the difference between these pressures is how hard the brakes are applied.

However these systems are not airtight and therefore when leaks occur the train pipe and the reservoir (although leaking much slower than the train pipe) will trend towards empty. The way to create a vacuum in both systems is to use the large ejector by pulling the brake lever back which will charge the system, and once the train pipe pressure reaches the same as the reservoir then an automatic valve will open and the reservoir pressure will increase as well.

The large ejector is steam powered and requires a pressure of at least 90 psi in the boiler so be careful to manage this properly or you may not be able to release the brakes.

To this point we have referred to the train pipe as it applies to the engine, however on a fitted train (where some or all of the rolling stock is fitted with vacuum/air brakes) this pipe is shared along the whole train via flexible connecting pipes. This means that the ejector and pump are creating vacuum along the whole length of the train and so this will increase the time that it takes to create or release pressure from the train pipe. In addition fitted stock have their own reservoirs so even if the train pipe is at 0" and engine reservoir falls to 0" (no pressure difference and therefore no brake application on the engine) the train will still be held by the brakes on the rest of the fitted stock. When running light or on a totally unfitted train you do not have this "backup" and it is advisable to apply the handbrake when stopping for any length of time as the train and pipe reservoir will slowly drain to empty, releasing the engine brakes.

In Train Simulator there is no way for the engine to know what stock it is pulling so the 9F uses the player selected head code to indicate how much of the train is vacuum fitted.

The head codes and percentages are as follows and on changing lamps (see section on head code setting below) you will see a message describing the code and how much of the train is fitted with vacuum brakes.

- A: Express passenger 100%
- B: Stopping passenger 100%
- C: Parcels, perishables, etc. 100%
- D: Express freight 100%
- E: Express freight 50%
- F: Express freight 0%
- G: Light Engine 100% (can have 1 or 2 brake vans which would be fitted)
- H: Through freight or Ballast 0%
- J: Through mineral or Empty 0%
- K: Pick up/Branch freight 0%

So if you are pulling a passenger train (using head code A for example) then the brake simulation will use 100% of the length of the train to calculate how long it takes to gain and lose pressure in the train pipe.

Finally, although not required for standard operation you can manually release pressure from the brake reservoir using the Reservoir Drain Valve.

Keys: Ctrl-P (hold to release)

11. Sander

The steam sanders assist in starting and stopping the locomotive without the wheels slipping by placing sand on the rail in front of and behind the driving wheels. There is a single sanding lever with off being in the centre and forward/backwards either side at 90 degrees.

Keys: X, Shift X

Advanced Mode

Sand is essential in pulling away with minimal wheel slip in wet or icy conditions and you must make sure to use the correct sander for the direction of travel so sand is placed “in front” of the wheels.

12. Whistle

Steam locomotive whistles are powered by steam from the boiler and are used to signal a trains approach, warn of danger and often to signify departure.

Key: Space (Main whistle), Ctrl-Space (short whistles)

Whistles were also used to communicate with signalmen, requesting clearance to go via certain tracks, etc. We have simulated this by adding a whistle sound when you use Tab and Ctrl-Tab to pass signals at danger. In truth there were dozens of whistle codes used for numerous request types however within the limitations of the game we have included a single long-short-short whistle to replicate this regularly used system.

13. Handbrake

A hand operated screw that applies the brakes to the locomotive and tender without the need to apply the engine brake.

Key: /

14. Windows

To provide ventilation for the crew or to protect them from the elements you can open and close the side windows. Click and drag with the mouse.

15. Head code and Lights

The 9F has a standard BR 4 lamp set up for the engine and tender – 1 lamp at the top and 3 below – to show the standard BR head codes (see [Appendix](#)).

The codes can be pre-set using the scenario locomotive number or changed by the driver at any time.

You can show or hide each lamp by holding the Control key and pressing numbers 1 to 4 on the keypad.

The lamps are also intelligent in that they will not show for each end if something is coupled to the locomotive or tender.

H and Shift H control the locomotive lights as follows:

- 0 – Lights off, forward running
- 1 – Lights on, forward running
- 2 – Lights on, reverse running
- 3 – Lights off, reverse running

Keys: H, Shift H, Ctrl + Numpad 1-4

Note: If you have a locomotive that has the additional Southern brackets you can add “fake” lamps in the additional positions using Ctrl + Numpad 5 or 6. These lamps will not change the “internal” headcode value used to set the fitted length in Advanced mode but are for visual effect only.

16. Water Scoop

This lever operates a screw that raises and lowers the water scoop on the tender. This is used to fill the tender from water troughs in the track while travelling at speed.

Key: Ctrl-T

17. Additional controls

Toggle cab lamp (on tender shelf): Shift + Ctrl + L

Banking Light (Lickey Banker loco only): Ctrl + Numpad 7



Driving in Advanced Mode

Advanced Mode ONLY

The following is a summary of how to drive successfully in Advanced Mode. It does not contain hard figures – e.g. set the reverser at 25% and the regulator at 30% - as these are the things you will learn by driving the locomotive.

However, there are some realistic features that are incorporated that require some specific knowledge for the best operation.

Before you start

Dampers – make sure you have the dampers set for running in the appropriate direction if the fire requires air. Cutting off the air is a good way to limit the boiler pressure from increasing when at a stand or running downhill (see [Controls Section 6](#)).

Head Code - If you wish to, set the appropriate head code (see [Controls Section 15](#)).

Fire – Assuming you are not using the auto-fireman and not about to run downhill for a long way you will want to start building the fire as soon as possible (see [Controls Section 4](#)).

Gauge Glass Test – If you have time at the start of a scenario then you can perform gauge glass tests to pass the time (see [Controls Section 9](#)).

Setting Off

Cylinder Cocks – If you are just starting or have been stationary for a while, ensure that the cylinder cocks are open. As you drive off, listen for the change in pitch as the water empties or count 4 full revolutions of the wheels and then close them (see [Controls Section 3](#)).

Wheel Slip – In wet or icy conditions due to the accurate wheel slip and simulated steam chest you will need to use the regulator like a real driver would. Primarily on starting (when the reverser cut off is high) this means you must manage the steam entering the pistons to make sure that the power being applied to the rails does not exceed the amount of grip available.

If you open the regulator and just leave it open the pressure will continue to build as will the amount of power being applied to the rail. This will likely cause wheel slipping.

As a real driver would you need to “pump” the regulator to gradually build the pressure in the cylinders as you accelerate. This means opening the regulator for a moment and then closing it again, the residual steam will continue to work and cause the locomotive to carry on accelerating. Continually doing this will allow the locomotive to build speed and pressure gradually and avoid wheel slip.

Once a slow speed is reached you can then leave the regulator open and accelerate and adjust as needed to maintain a constant speed.

The speed at which you can stop pumping varies and is based on how much grip is available – an icy rail will need a much higher speed to allow full power than a dry rail.

The weight of the consist will also affect how long it takes before this speed is reached (simply because a heavier load takes longer to accelerate) which means you are more likely to have to manage the wheel slip for longer, therefore making it more likely.

In summary, as you set off do not throw the regulator to full and leave it there! Pump it gradually, increasing the power slowly until you can leave the regulator open. And be aware of the weather, a wet or icy rail provides a lot less grip.

This brings us to:

Sander – The sander helps to provide grip for the wheels on the rail and should be used when starting in wet or icy conditions (see [Controls Section 11](#)).

Under Way

Water Filling – You will need to use the water levers and the injector steam levers to fill the boiler (see [Controls Section 7](#)).

Due to the water gauge glasses wobbling around and being effected by gradient and acceleration it is normal procedure to try and keep the boiler between half and three quarters full to avoid overfilling the boiler and causing priming to occur.

Locomotive Numbering

When a 9F is added to a scenario the number will be randomly chosen from a list of all available members of the class for the specific era.

These are pre-set with the correct configurations for each number as they were historically outfitted. However if you wish to change any of the components then the setups are listed below.

We have also created a simple app which allows you to build a loco number using a system of simple drop down menus and text boxes. Please see this page on our blog for details and a download link

<https://victoryworksts.blogspot.com/2019/01/victory-works-locomotive-number.html>

9F

e.g. **9200086A02N1NNY1YNOLMNNNS**

1 to 5. 5 digit locomotive number

6 to 8. 3 digit shed code

9. Headboard

- 0. None
- 1. Cornish Riviera
- 2. Torbay Express
- 3. Mayflower
- 4. Royal Duchy
- 5. The Moorlander
- 6. The Red Dragon
- 7. Santa Special
- 8. Pines Express (Red)
- 9. Pines Express (Black)

10. Logo

- 0. None
- 1. Pre-1956
- 2. Post-1956

11. Lining (where available) **Y/N**

12. Power Class Display

- 0. None
- 1. 9F
- 2. 9

13. GWR Power Disc **Y/N**

14. Overhead Warning Labels **Y/N**

15. Self-Cleaning Smokebox **Y/N**

16. Smokebox Front Steps
 0. None
 1. Twin
 2. Single
 3. Single with support
17. Left hand side Pipe Cover **Y/N**
18. GWR Reverser Step Cover **Y/N**
19. Ashpan Doors **O**pen/**C**losed
20. Cylinder Drains **L**ong/**S**hort
21. Crank **LMS/LNER**
22. Southern Region Lamp Brackets **Y/N**
23. Steam Heating **Y/N**
24. Speedometer **Y/N**
25. AWS/ATC
 - N** None
 - Y** BR style
 - G** GWR style
26. Cab Shelf **S**hort/**L**ong
27. Head code – letter of the head code class, Optional (see [Appendix](#))

Black Prince

As **9F**, but:

27. Black Prince Nameplate
 0. None
 1. Black
 2. Red
28. Brass Cab Numbers (92203 ONLY) **Y/N**
29. Head code – letter of the head code class, Optional (see [Appendix](#))

92214 (Green)

As 9F but:

27. Nameplate
 0. None
 1. Central Star
 2. Leicester City
 3. City of Leicester
28. Head code – letter of the head code class, Optional (see [Appendix](#))

Modification Policy

You are free to create modifications for this pack (including but not limited to re-skins, sound updates, “enhancement” packs, etc.) but they must not include any 3D model files, audio samples or scripts – original or modified. If you choose to make your mods public then they **must be provided free of charge**. They can be hosted on a site that asks a nominal membership fee for quicker downloads (e.g. UK Train Sim) but **cannot be sold in any way** without the express permission of Victory Works and Steam Sounds Supreme.

If you wish to discuss terms for selling modifications please contact us via email at victoryworks@live.co.uk

To summarise – free mods are fine but must not include model, audio or script files. If you wish to sell mods then you **MUST** get permission first.

Acknowledgements

We would like to thank the following people for their help during this project:

- Steam Sounds Supreme and the excellent QA testing group
- Chris Barnes for his smoke/steam textures
- Thanks to the many people who contacted us with photos and details of the 9F's but an especially big thank you to James Conway for his hands on experience.



Appendix: Head codes

