

Standard Vacuum Brake Ejectors

Designed by Bob Bramson

Instructions for Fitting and General Notes

Introduction

The range of Standard Vacuum Brake Ejectors has been evolved following considerable experimentation to provide a reliable and efficient means of creating vacuum on steam locomotives for powering brake systems fitted to 7/4" gauge rolling stock.

The ejector performance has been optimised to achieve the following:-

- Create 21" Hg. vacuum over a working range between 70 to 80 p.s.i. using reasonably dry saturated steam.
- The minimum boiler pressure required to create 21" Hg. to be about 35 p.s.i.
- The ejector to maintain this level of vacuum up to 120 p.s.i.
- The rate of air ejection to be capable of exhausting a brake system appropriate to the size of the locomotive.
- Low steam consumption. The demand for steam to be as low as practicable and in proportion to the locomotive's grate area.
- The air clack to remain tight over long periods without maintenance.

To enable this, a range of ejectors has been developed to suit boilers having grate areas as follows:-

No. 0	20 to 35 in²
No. 1	30 to 60 in²
No. 2	55 to 80 in²
No. 3	75 to 100 in²

If a larger than optimal size ejector is fitted, this is not likely to affect performance but will result in greater steam consumption and provide higher evacuation rates.

Fitting Instructions

The No.1 ejector is supplied with male steam and air couplings screwed 5/16" x 32 t.p.i. The couplings have flat faces, union nuts and nipples. The exhaust end is supplied with a collar drilled 5/16" for soldering to the exhaust pipe. The ejector mass is kept to a minimum to avoid condensation.

It is necessary to fit a 1/8" bore (minimum) screw operated steam valve taking steam from the driest source available (preferably the dome but should work satisfactorily from the turret). Mount the valve in an easily accessible location in the cab.

The ejector must be mounted with the body horizontal and the air clack vertically downwards. The serial number must be on the top. It is not desirable to bolt the ejector to the cab structure; it should be supported by the pipework.

Pipe the steam valve using 5/32" o.d. copper tube to the ejector and silver solder the pipe to the nipple provided. Keep the pipe length as short as reasonably possible or lag it with suitable insulation material.

Use 3/16" o.d. preferably brass tube for the brake pipe. Silver solder to the nipple provided. Run this pipe to the system Brake Pipe. Ensure that the vacuum pipe system is thoroughly cleaned-through prior to assembly. Failure to complete this may render the non return valve inoperative.

The exhaust pipe may be of thin wall 5/16" o.d. copper or brass tube. It is recommended to keep the length as short as possible to limit back pressure, however, if it is desired to run the exhaust pipe to the smokebox, it will be found that the steam tends to condense and water drops will be ejected from the chimney particularly when opening the steam valve. The pipe can be connected to an elbow and directed by another pipe upwards to the inside of the petticoat. Ensure that there is no constriction of the bore. It is possible to run the exhaust into the ash pan pointing towards the front of the grate. In this case, scarf the end of the pipe at 30° to diffuse the exhaust. Silver solder the end of the pipe to the ejector collar taking care to ensure that the ejector sits square when screwed home. Do not over tighten the collar, as the wall thickness of the ejector is quite thin at this point.

General Notes

1. The steam valve should be left open prior to setting off and remain open at all times that the train is in motion. It may be shut when standing at stations.
2. At low boiler pressures (35 to 50 p.s.i.) the steam valve will need to be fully open. As the steam pressure rises it will be necessary to progressively throttle the steam supply. Between 100 and 120 p.s.i the steam valve will be almost shut. The same phenomenon occurs in full size except that it is more pronounced in our scale due to the greater range of steam velocities.
3. The only maintenance that should be necessary is to clean the air clack (wash through under the hot water tap) should excessive leakage become evident. Periodically, say yearly, the steam and air cones should be cleaned. This can be achieved by submerging the ejector body in a solution of hot kettle de-scaler for ten minutes. Wash thoroughly with clean, cold water after de-scaling.