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Is the injector faulty?

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The miniature injector supplied by reputable dealers these days can be relied upon to do the job it is supposed to do, but there are some do's and don'ts that should not be ignored.

- (1) The injector must be supplied with all the steam it needs without restriction. (
- 2) It must be supplied with all the water it needs without restriction.
- (3) The water supply must be completely air free.
- (4) The injector delivery pipe must also be restriction free. None of the above should be compromised or the injector will not work properly.

The internal cross-sectional areas of the pipe work must not be reduced or restricted in any way. There must not be any flattened bends or blockages with over generous silver soldering. Don't worry about 90-degree bends provided the above comments about restrictions are observed, after all most check valves are 90 degrees aren't they?

Many of the problems that people experience are because they attempt to diagnose the problem by looking at the injector in isolation, whereas, the complete system must be considered. This consists of the steam supply from the boiler and most importantly its pressure, the steam manifold, steam valve, water filter, water valve, boiler check valve and all the pipe work. All these parts must carry the flows to and from the injector without restriction. All the above must be carefully checked and eliminated before blaming the injector itself. A point to note here is how accurate is the pressure gauge? If it is not reading correctly, you might be trying to operate the injector outside its working pressure range.

The water supply to the injector must be air free, in other words it is vital that no air can be drawn into the injector with the water supply - the gland on the water supply valve is often a culprit. Also check that any flexible tubing, which may be part of the water feed, is not being sucked flat. There must be an adequate filter in the water supply.

In hard water areas, water left in the pipe work when an engine is stored out of use for some time, can evaporate leaving tiny deposits, which can block an injector. Probably, the most likely problem area is the delivery clack valve.

There must be sufficient annular clearance around the ball for delivery to take place and the design must make it impossible for the ball to enter the boiler. Many commercial clack valves are designed to allow the ball to lift too far. It should lift approx 1/32" and it is a good idea to put a shallow countersink in the underside of a new cap to stabilise the ball after it has lifted. If there is too much lift the ball can 'hover' causing the injector to splutter.

If an injector does not pick up, look at the overflow. If steam overflows you have insufficient water – if water overflows you have insufficient steam. If a mixture overflows, then the problem is most likely the clack valve.

If having fastidiously checked all the above you should then have an injector which will work bone dry at the overflow, at the designed working pressure; steam or water on first. It should be self-starting with the steam and water valves fully open until the falling boiler pressure requires adjustment of the water valve to compensate.

One more thing, injectors do not like a hot water supply. If you have a tank engine, then the water in the tanks can get too hot for the injector to work. If this is the case, then re-arrange the plumbing so that a cold feed is delivered from either a well tank on the engine or a tank on the riding trolley.

A check that it is working properly is to turn the water on and when water dribbles from the overflow, turn on the steam. Watch the overflow, a squirt of water should eject from the overflow and then as the injector starts to work the overflow should be dry. If not adjust the water valve until it is.

The injector, clack valve and pipes will periodically require cleaning especially if you have been using hard water. Citric acid at strength of 1-2 ozs. to 2 pints of water should do the trick. Don't just leave the components in the mixture to soak - blow the pipes through once or twice so that fresh acid reaches the surfaces as it soon becomes exhausted. Don't mix up the cones; the one with largest bore (strangely) is the steam one. If after all the above has been checked and double checked your injector still does not work, then is the time to send it back to your supplier or make one yourself.