

# DIAGNOSTIC FLOWCHART

*by Barry Applegate & Dick Moger*

The charts that follow are reproduced from Newsletter 173 of April 1997. They were originally produced by Dick and Barry with the assistance of Tony Hall-Patch, as part of the G1MRA Forum in 1996. It is reproduced here so that those who have joined G1MRA since then can use it, and those who saw the original are reminded of it. As Dick said in his accompanying note "The Diagnostic charts are intended to assist both beginner and experienced builder alike. Beginners should find the flows instructive and logical while older hands might still find something of use before resorting to kicking the cat ...or worse!"

## **ACTION A**

Check for:

1. All burner elements alight.
2. Blue flame (red or yellow could mean fuel starvation).
3. Obstructions.
4. Wick height
5. Wick packing.
6. Blockage in fuel line.
7. Contaminated fuel.
8. Excess or inadequate air entry
9. Diameter and angle of chicken feed.
10. U Bends in fuel pipe
11. Tight fit of meths tank and no bleed hole to allow sump to fill.

## **ACTION B**

Check for:

1. Sealing of smokebox door and airtight fit to boiler and chassis.
2. Drawing of the flame (Use mirror).
3. Blockages in flues.

## **ACTION C**

Check for:

1. Correct flue dimensions and alignment. (1 in 3 and 1 in 6 cones).
2. Correct size blower jet (Small!).
3. Blockages in blower pipes or jet.

Use hand pump to over fill boiler with water and open blower control. The jet of water will indicate the alignment.

Use a lighted match held near the chimney to see if an incomplete vacuum is being created... The flame will be sucked into the chimney despite the exhaust if the dimensions or alignment are incorrect.

## **ACTION D**

Check for:

1. Faulty clack valve.
2. Weeps around fittings.
3. Subsequent failure of bushes tubes or plates.

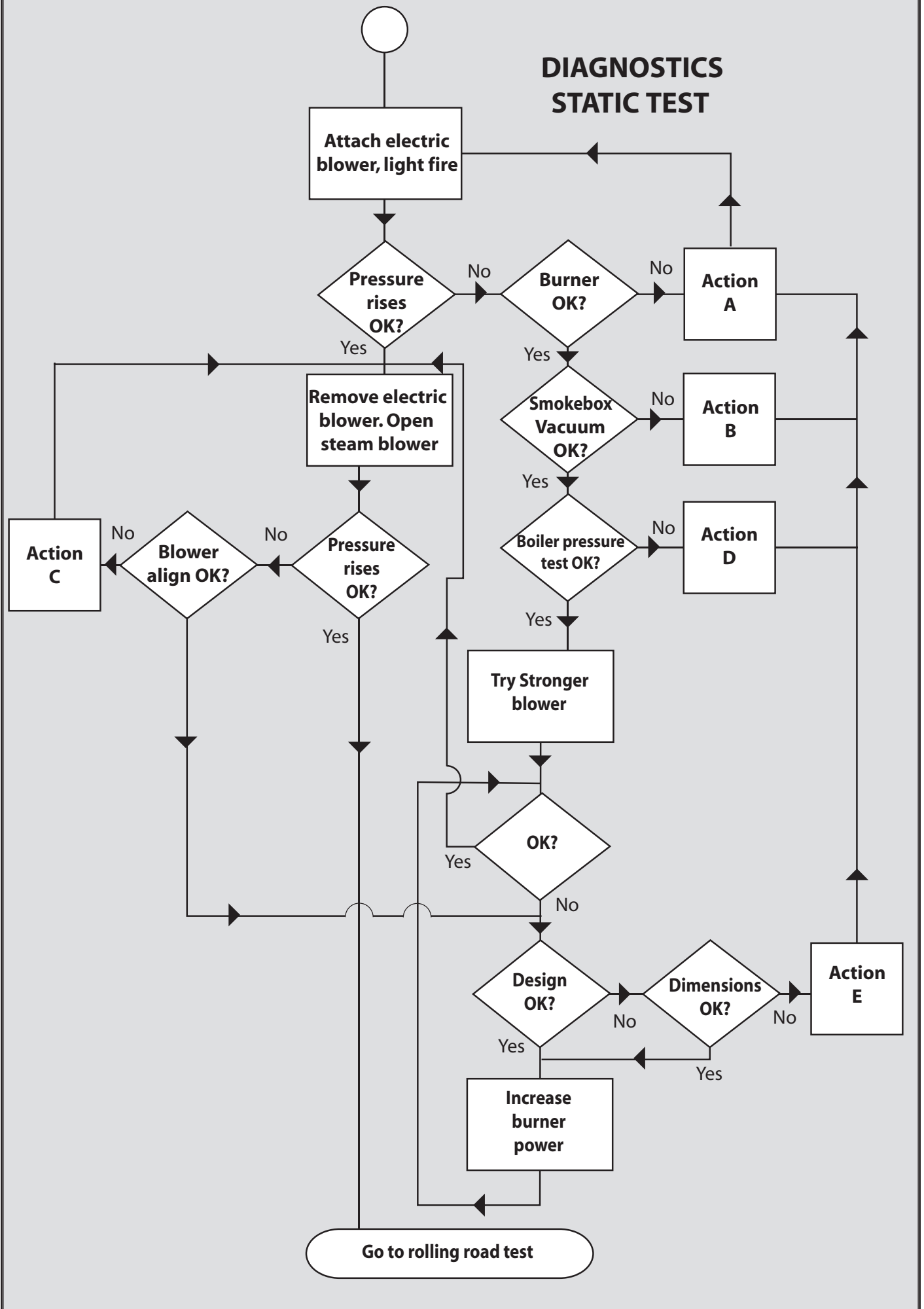
Note: This diagnostic assumes that the boiler was previously tested and issued with a certificate. If silver solder repair work is carried out on the boiler a full hydraulic test to twice working pressure is required

## **ACTION E**

Check the basic boiler design against JVRs comments.. i.e. Cross section area of flues and tube length/bore ratio.

If the remedies John mentions. or the use of CADN1T (kettle defurring stainless steel wool. do not improve matters) a new boiler to a known successful design may be required.

# DIAGNOSTICS STATIC TEST



## **ACTION F**

Check for:

1. Appropriate holes in cylinder gaskets to allow steam in and exhaust out.
2. Blocked steam passages.
3. Blocked exhaust.
4. Chassis mechanics as in Action N

## **ACTION G**

Check for:

1. Valve travel giving equal port openings.
2. Even marking of port face to indicate full contact of valve.
3. Lifting valve (Striking gasket or steam chest)
4. Dropping off of valve in underneath valves. (inverting chassis briefly may correct this)
5. Damage to port face by excessive wear.
6. Lubricator functioning with correct oil.
7. No lift on top ball of axle pump or clack.

Note Disconnecting the valve rod from its drive and moving it by hand under air pressure can reveal faults.

## **ACTION H**

Check front end as for actions B and C Also check for steam or exhaust leaks in the smokebox.

## **ACTION J**

Check for:

1. Correct interference fit if 'O' ring.
2. Flats on outside diameter of 'O' ring.
3. Missing or inadequate piston packing.
4. Too tight packing.
5. Worn pistons.
6. Worn or bell mouthed bores.
7. Lubricator function.

## **ACTION K**

Check for:

1. Valve and piston gland packing
2. Gasket leaks
3. All steam feeds (including smokebox connections).

Note. steaming leaks can be checked on a cold day or under air using a paintbrush and soapy water.

## **ACTION L**

First check for steam leaks as Action K. Then try fitting a larger burner, but be aware that this may simply mask another problem.

Check for:

1. Correct colour of flame (Blue).
2. Lack of fumes from unburnt fuel.
3. Overspill of flame from firebox.
4. Popping forward of flame into smokebox when under load. (This usually indicates inadequate flue cross section area).

## **ACTION M**

Rotate wheels by hand and note position of cranks and valves.

Check for:

1. Wheels loose on axles.
2. Damaged crank axle.
3. Binding coupling rods.
4. Loose pistons or piston rods.
5. Faulty axle pump.
6. Loose crank pins.
7. Broken or slipping weigh shaft.
8. Screws or brake gear on chassis fouling motion.

## **ACTION N**

Strip down to chassis and run on air. Redo Actions F. G. J. K. and M.

