NITROUS FLOW DISTRIBUTION PROBLEMS & SOLUTIONS

A couple of years ago and to our surprise (which when you're aware of it is not the case), we discovered that nitrous oxide flow is subject to the basic laws of physics (surprise, surprise), which in it's simplest terms is best stated as follows;

1) Nitrous oxide has mass.

2) When that mass is flowing in a given direction it wants to continue flowing in that direction.

3) Therefore if nitrous flows along a straight section of pipe in to a bend the nitrous wants to continue flowing in a straight line, which results in the nitrous molecules concentrating along the outer wall of the bent tube, rather than evenly throughout the tube section.

4) A simple analogy of the phenomena that we're dealing with here, is a car with unsecured occupants driving round a sharp corner, which as we all know results in all the occupants being thrown to the side of the car on the outside of the bend.

5) Furthermore, just as it takes times for the car occupants to return to their normal positions in the car after exiting the bend, so to does the nitrous take time to evenly distribute throughout the cross section of the tube.

6) Now this is no major concern as long as the tube is the only component involved but when other components which are designed to split the flow **in an even manner** are involved, it becomes **a major problem.**

7) After we discovered the extent this phenomena had on nitrous flow and the consequential bad effects on distribution, we carried out extensive R&D to determine ways to overcome the problems it causes.

8) We determined that the simplest and easiest solution is to ensure that any distribution component is fed by a **straight** section of tube that is **at least 2" long**, as this gives the nitrous molecules the required time to return to normal after passing through a bend.

The following drawings show the results of R&D testing with our Y-Blocks.

Fig. A1 & A2

When the entry tube is positioned as shown above and below, the distance between the Y-Block & the bend point can be any distance without having an adverse effect on the distribution from the outlets.

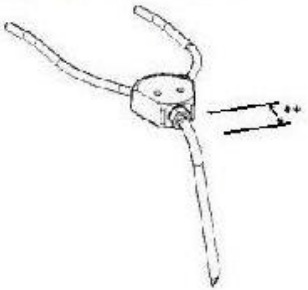
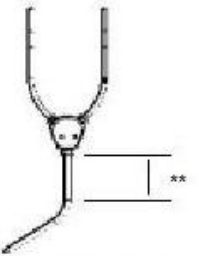
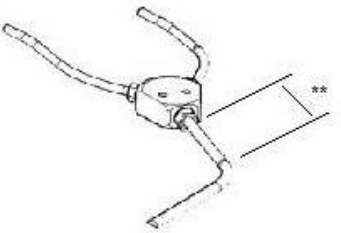


Fig. A2 & A3



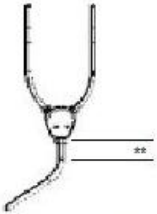
When the entry tube is bent in the plane shown, the distance between the Y-Block & the bend shown as ** MUST be at least 2" to achieve even distribution from the outlets.



The statement applicable to A1 & A2 **ONLY** applies when the entry tube is at a perfect 90 degrees to the flat plane of the Y-Block and anything between 0 and 89 and 91 to 180 degrees will cause progressively worsening distribution.

The following drawings show how distribution is affected by incorrect plumbing and/or fitting.

Fig. B1 & B2



With the feed pipe bent as shown above & below, if the distance to the bend (shown as **) is less than 2", the effect on the nitrous flow is to cause a bias towards the right hand exit tube, resulting in uneven distribution.

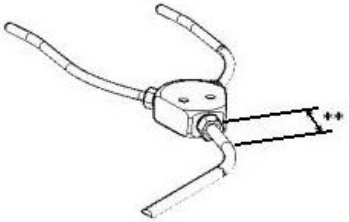
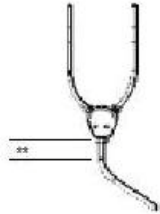
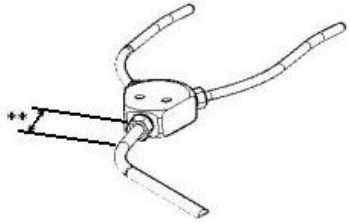


Fig. B3 & B4



With the feed pipe bent as shown above & below, if the distance to the bend (shown as **) is less than 2", the effect on the nitrous flow is to cause a bias towards the left hand exit tube, resulting in uneven distribution.



As stated above this phenomena applies to any component that is intended to distribute the nitrous and therefore also applies to distribution blocks (D-blocks) and as most people use a 90 degree elbow on the entry to the D-Block is an unavoidable problem and in this case it's not possible to have a straight entry of 2" in length to correct it. However, once again after extensive R&D we discovered a solution to the problem, so all is not lost. By adding a 'restrictor' to the outlet side of the D-Block inlet elbow, the nitrous flow is prevented from taking its desired path and is forced to flow down the centre, resulting in even distribution.

The following diagrams show the nitrous flow through a D-Block fitted with an elbow, with and without a restrictor.

Fig. C1

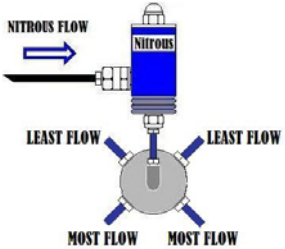
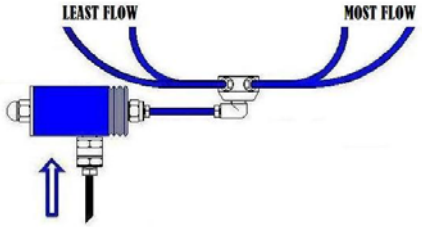
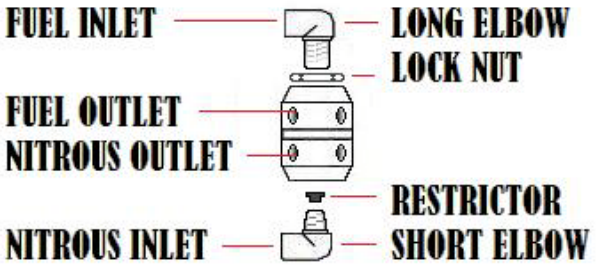


Fig. C2



With the cure (the 'restrictor') shown below.

Fig. C3



All flow suffers from the same forces and the higher the flow rate and the sharper the bend, the more severe the effect on the flow, therefore fuel suffers the same problems but to a lesser extent.