BIRD PRECISION DATA SHEET

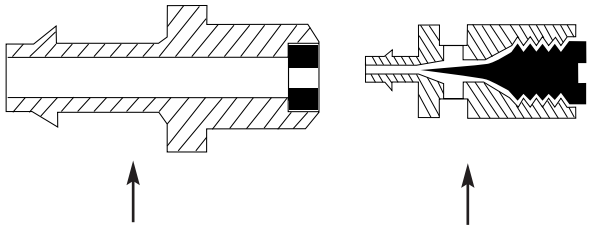
Fixed Valves

As technology demands precision and smaller tolerances, engineers are turning to Bird Precision fixed valve orifices. We offer a high-value solution in nozzle, restrictor and orifice applications, all designed with Bird Precision accuracy.

Conventional drilling methods inherently sacrifice quality and dependability due to drill wobble, run out and burr generations. Bird Precision wire-lapped orifices are burr-free, extremely round and sharp-edged with a standard hole tolerance of +.0002/-.0000 inches.

Economically produced using mass production techniques, standard hole sizes range from .00029 through .081 inches in a synthetic sapphire or ruby material which is almost chemically inert and extremely wear resistant.

Bird Precision orifices are acclaimed for accuracy. They exhibit highly repeatable flows from .5 cc/min.



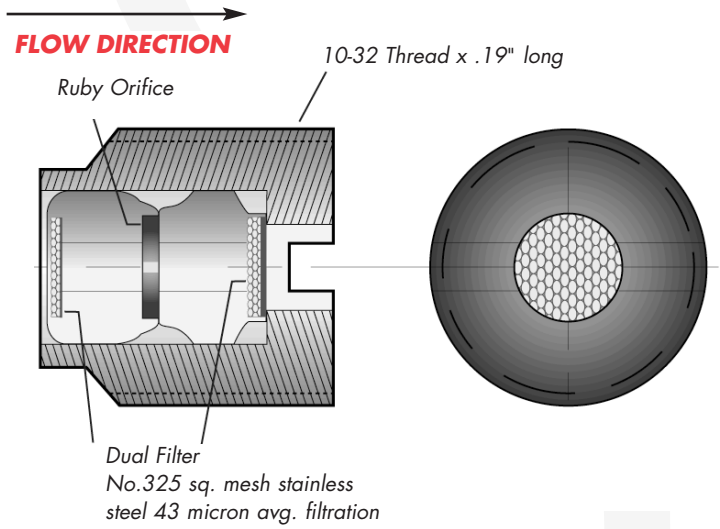
FIXED ORIFICE replaces the NEEDLE VALVE

Fixed Valves

Needle valves allow the adjustment of flow until a desired level is reached, at which point the flow to the system is supposedly fixed. The problem comes when someone later decides they want to make their own adjustments, thereby disturbing the original calibrated flow. As a result, many engineers are replacing expensive needle valves with less expensive fixed orifices that cannot be tampered with. Bird Precision stocks a wide range of flow sizes that are extremely repeatable for flow even in high quantities.

Application: *Fixed Valve Solves Scuba Design Trouble*

In scuba diving, the scuba tank is the diver's life source. When diving with mixed gases, it is essential that the diver can accurately sample the oxygen level before using the tank. Nitrox Technologies Inc. (NTI), a California-based manufacturer of air separation systems, was faced with the challenge of creating a highly accurate, yet cost effective, flow restrictor for use in their MAX02 oxygen analyzer, used by divers the world over. They found their solution in a Bird Precision fixed ruby orifice with a diameter of 0.005".



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Fixed Valves

Needle valves are often used for flow restriction in other industries, but can be dangerous or even deadly in scuba applications because the rate of flow can be easily altered by one user without another's knowledge. Since pressure increases with depth, the deeper a diver goes, the higher the total pressure of oxygen inhaled. Too high an inhaled oxygen pressure can be toxic to the lungs and central nervous system, causing seizures, often resulting in the diver inhaling water and drowning.

Several design challenges had to be overcome: the flow restrictor had to provide an extremely even, regulated flow through the analyzer to ensure an accurate measurement; the restrictor had to contain the fixed valve; and the restrictor had to be cost effective.

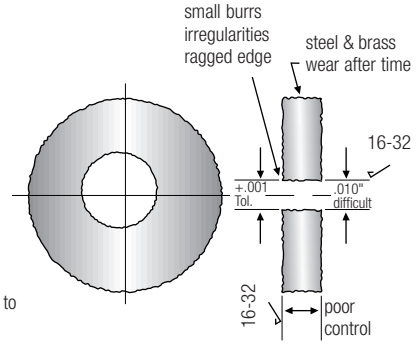
Bird Precision created for NTI a fixed valve that allowed for highly repeatable flow. The orifice provides a precise flow rate through the oxygen analyzer to insure stability and accuracy in the analysis of oxygen. This inexpensive and safe solution solved NTI's problem with improved results.

Bird Precision creates a wide variety of orifices ranging in size from .00029" to .081" that can be produced in high volume with extreme accuracy. Our orifices have been used in a variety of applications and industries in need of flow restriction, including medical equipment and instruments, OEM applications, aerospace equipment, transportation engines and parts, and many others.

A Comparison of Machining Methods

Drilled EDM or laser machining hole piercing methods cause:

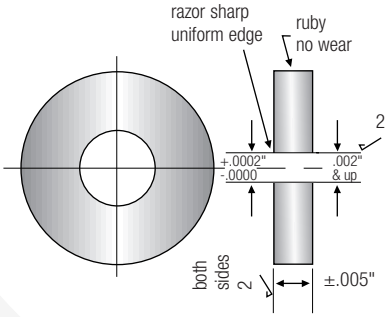
- Ragged edges
- 16-32 micro inch finish
- Burrs
- Tool marks
- Out of round conditions
- Cd values vary
- Must be checked and matched to balance flow
- Small sizes difficult
- Tolerance control .001" difficult



Other Methods

Bird Precision's method of wire lapping and flat surface lapping results in:

- Razor sharp edges
- 2 micro inch finish
- Roundness better than .000050"
- Concentricity .0003" or better
- Controlled bore length
- Cd very uniform
- 1,000's matched flows with sizes from .0002" and up
- Tolerances .0002" the norm
- Long life without wear



Bird's Method

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