CLAIMS

1. An apparatus for controlling flow through a flow body comprising:

an intake opening and an output opening in the flow body;

a cavity with a first cross-sectional shape and an opening;

a diaphragm or a bellows, wherein the diaphragm or the bellows seals the opening of the cavity and the diaphragm or the bellows includes a hole;

a plunger with a second cross-sectional shape corresponding to the first cross-sectional shape of the cavity, wherein the plunger comprises a plunger tip located at an end portion of the plunger, and wherein the plunger is longitudinally movable within the cavity and the plunger forms an orifice with the cavity;

a sealing surface within the cavity along the first cross-sectional shape, wherein the plunger tip is configured to contact the sealing surface, wherein the plunger tip is configured to be spaced from the sealing surface, and wherein a flow path between the intake opening and the output opening is closed when the plunger is in a first position and open when the plunger is in a second position; and

a rod coupled with the plunger for facilitating the longitudinal movement of the plunger, wherein the rod comprises a rod cross section that corresponds to the hole in the diaphragm or the bellows.

2. The apparatus of claim 1, wherein the bellows or diaphragm comprises one or more of a metal or a non-metal.

3. The apparatus of claim 1, wherein the flow path comprises the intake opening, a portion of the cavity proximate an end of the plunger, and the output opening.

4. The apparatus of claim 1, wherein the plunger comprises one or more of a metal, a polymer or a combination of a metal and a polymer.

5. The apparatus of claim 1, wherein the orifice comprises a first size with the rod at a first position and the orifice comprises a second size with the rod at a second position.

6 The apparatus of claim 5, further comprising an actuator, wherein the actuator is coupled with the rod and configured to longitudinally move the plunger within the cavity, between the first position and the second position.

7. The apparatus of claim 5, further comprising a manual interface coupled with the rod, wherein the manual interface is configured to facilitate positioning the plunger at the first position or the second position.

8. The apparatus of claim 1, further comprising a passage through a portion of the plunger.

9. The apparatus of claim 8, wherein the flow path comprises the intake opening, the passage through the plunger, and the output opening.

10. The apparatus of claim 8, wherein the passage comprises a cross-sectional shape of a circle, a square, a triangle, a pentagon, a hexagon, and a polygon.

11. The apparatus of claim 8, wherein the sides of the passage are converging, diverging, or parallel.

12. The apparatus of claim 1, further comprising a profile shape at an end of the plunger.

13. The apparatus of claim 12, wherein the profile shape comprises a cross-sectional shape of a circular portion, a square portion, a triangular portion, a pentagonal portion, a hexagonal portion, and a polygonal portion.

14. The apparatus of claim 1, further comprising a cap, wherein the cap is coupled with the flow body by a plurality of fasteners.

15. The apparatus of claim 1, further comprising a bolt, wherein the bolt is coupled with the flow body by a threaded connection, and the bolt comprises a rod opening.

16. The apparatus of claim 15, further comprising a seal between the flow body and the diaphragm or bellows.

17. The apparatus of claim 15, further comprising a bump seal between the flow body and the diaphragm or bellows.

18. The apparatus of claim 15, further comprising an adhesive between the flow body and the diaphragm or bellows.

19. The apparatus of claim 1, further comprising an actuation rod, wherein the actuation rod comprises a direct or an indirect couple to the diaphragm or the bellows.

20. The apparatus of claim 1, wherein the output opening is sized to match a maximum flow through the apparatus.

21. The apparatus of claim 1, wherein the intake opening and output opening are configured to be linear and in one plane.

22. The apparatus of claim 1, wherein the plunger tip is configured to deform.

23. The apparatus of claim 22, wherein the deformation of the plunger tip is configured to conform to a profile of the sealing surface.