controlling flow has a body, a valve, a flow restrictor, and a pressure sensor. The body has a flow path extending from an inlet to the outlet. The valve is operably coupled to the flow path between the inlet and the outlet, the valve configured to alter fluid flow within the flow path. The valve has a seat and a closure member. The flow restrictor has a flow impedance and is located within the flow path. The pressure sensor is configured to measure pressure within a volume between the seat of the valve and the flow restrictor.

[0006] There is also disclosed an apparatus for controlling flow. The apparatus for controlling flow has a body, a valve, a flow restrictor, and a pressure sensor. The body has a flow path extending from an inlet to an outlet. The valve is operably coupled to the flow path between the inlet and the outlet, the valve configured to alter fluid flow within the flow path. The valve has a seat, a closure member, a biasing element, a first actuator, and a second actuator. The closure member is configured to engage the seat. The biasing element biases the closure member into contact with the seat. The first actuator is configured to apply a first force to the biasing element. The second actuator is configured to apply a second force to the biasing element. The flow restrictor has a flow impedance and is located within the flow path. The pressure sensor is configured to measure pressure within a volume between the seat of the valve and the flow restrictor.

[0007] There is also disclosed an apparatus for controlling flow. The apparatus for controlling flow has a body, a valve, a flow restrictor, and a pressure sensor. The body has a flow path extending from an inlet to an outlet. The valve is operably coupled to the flow path between the inlet and the outlet, the valve configured to alter fluid flow within the flow path. The valve has a seat, a closure member, a biasing element, a first actuator, and a second actuator. The seat is located within the body. The closure member is configured to engage the seat. The biasing element biases the closure member into contact with the seat. The first actuator is configured to apply a first force to the biasing element. The second actuator is configured to apply a second force to the biasing element. The flow restrictor has a flow impedance and is located within the flow path. The pressure sensor is configured to measure pressure within a volume between the seat of the valve and the flow restrictor. The volume is less than 0.1 cubic centimeters.

[0008] There is also disclosed an apparatus for controlling flow. The apparatus for controlling flow has a body, a valve, a flow restrictor, and a pressure sensor. The body has a flow path extending from an inlet to an outlet. The valve is operably coupled to the

flow path between the inlet and the outlet, the valve configured to alter fluid flow within the flow path. The valve has a seat, a closure member, a biasing element, and an actuator assembly. The closure member is configured to engage the seat. The biasing element biases the closure member into contact with the seat. The actuator assembly has a button, a plunger, a plurality of transmission pins, a piston, and a biasing element. The button engages the closure member. The plunger engages the button. The plurality of transmission pins is in contact with the plunger. The piston engages the plurality of transmission pins, and the biasing element engages the piston. The flow restrictor has a flow impedance and is located within the flow path. The pressure sensor is configured to measure pressure within a volume between the seat of the valve and the flow restrictor.

[0009] There is also disclosed an apparatus for controlling flow. The apparatus for controlling flow has a body, a valve, a flow restrictor, and a pressure sensor. The body has a flow path extending from an inlet to an outlet. The valve is operably coupled to the flow path between the inlet and the outlet, the valve configured to alter fluid flow within the flow path. The valve has a seat, a closure member, a biasing element, and an actuator assembly. The closure member is configured to engage the seat. The biasing element biases the closure member into contact with the seat. The actuator assembly has a button, a piston, a housing, a second actuator, and a biasing element. The button engages the closure member. The piston engages the button and the biasing element engages the piston. The housing surrounds the piston, the housing and the piston collectively forming a first actuator. The second actuator also engages the piston. The flow restrictor has a flow impedance and is located within the flow path. The pressure sensor is configured to measure pressure within a volume between the seat of the valve and the flow restrictor.

[0010] There is also disclosed a method for processing semiconductors. In a first step, a fluid is supplied to an apparatus for controlling flow. The apparatus for controlling flow has a body, a valve, a flow restrictor, and a pressure sensor. The body has a flow path extending from an inlet to an outlet. The valve is located within the flow path and has a seat, a closure member, a biasing element biasing the closure member into contact with the seat, a first actuator configured to control a position of the closure member relative to the seat, and a second actuator configured to control the position of the closure member relative to the seat. The flow restrictor is located within the flow path. The pressure sensor is configured to sense a pressure within a volume between the seat of the valve and the flow restrictor. In this step, the valve is in

a closed state preventing the fluid from flowing out of the outlet. In a second step, a command is received from a controller to flow the fluid at a predetermined flow rate. In a third step, the second actuator is transitioned to an active state to control the position of the closure member in a first operating mode, the position corresponding to the predetermined flow rate. In a fourth step, the second actuator is controlled in a second operating mode wherein the second actuator is controlled based on feedback from the pressure sensor.

[0011] There is also disclosed a method for processing semiconductors. In a first step, a fluid is supplied to an apparatus for controlling flow. The apparatus for controlling flow has a body, a valve, a flow restrictor, and a pressure sensor. The body has a flow path extending from an inlet to an outlet. The valve is located within the flow path and has a seat, a closure member, an actuator configured to control a position of the closure member relative to the seat. The flow restrictor is located within the flow path. The pressure sensor is configured to sense a pressure within a volume between the seat of the valve and the flow restrictor. In this step, the valve is in a closed state preventing the fluid from flowing out of the outlet. In a second step, a command is received from a controller to flow the fluid at a predetermined flow rate. In a third step, the actuator is transitioned to an active state to control the position of the closure member in a first operating mode, the position corresponding to the predetermined flow rate. In a fourth step, the actuator is controlled in a second operating mode wherein the actuator is controlled based on feedback from the pressure sensor.

[0012] There is also disclosed a system for processing articles. The system has a fluid supply, an apparatus for controlling flow fluidly coupled to the fluid supply, and a processing chamber fluidly coupled to an outlet of the apparatus for controlling flow. The processing chamber is configured to process semiconductor devices. The apparatus for controlling flow has a body, a valve, a flow restrictor, and a pressure sensor. The body has a flow path extending from an inlet to the outlet. The valve is operably coupled to the flow path between the inlet and the outlet, the valve configured to alter fluid flow within the flow path. The valve has a seat, a closure member, and an actuator. The valve is normally open when the actuator is in an inactive state. The flow restrictor has a flow impedance and is located within the flow path. The pressure sensor is configured to measure pressure within a volume between the seat of the valve and the flow restrictor.

[0013] There is also disclosed an apparatus for controlling flow. The apparatus has a body, a valve, a flow restrictor, and a pressure sensor. The body has a flow path