CLAIMS

WHAT IS CLAIMED IS:

1. A system for processing articles, the system comprising:

a fluid supply configured to supply a process fluid;

a process chamber configured to process articles; and

a fluid delivery module, the fluid delivery module comprising:

an inlet fluidly coupled to the fluid supply;

an outlet fluidly coupled to the process chamber;

a flow passage extending from the inlet to the outlet;

a substrate panel;

a first component for controlling flow, the first component comprising a first port comprising a seal cavity, a second port comprising a seal cavity, and a first flow path extending from the first port to the second port, the first flow path forming a first portion of the flow passage;

a plurality of substrate blocks, a first substrate block of the plurality of substrate blocks comprising a housing and an insert, the insert comprising a port and a second flow path extending from the port, the port comprising a seal cavity, the second flow path forming a second portion of the flow passage, and the insert positioned within an insert receiving cavity of the housing; and

a seal positioned within the seal cavity of the first port of the first component and the seal cavity of the insert of the first substrate block;

wherein the plurality of substrate blocks are in contact with the substrate panel and the first component is coupled to the substrate panel and the first substrate block; and

wherein the port of the insert comprises a flange surface opposite a distal surface and a port outer diameter extending between the distal surface and the flange surface.

2. The system of claim 1 wherein the insert comprises a collar, the collar comprising a first collar surface, an outer diameter, and a second collar surface, the second collar surface parallel to the first collar surface.

3. The system of claim 2 wherein the insert comprises a longitudinal axis, the longitudinal axis extending through a center of the port and wherein the insert extends along a longitudinal axis, the longitudinal axis aligned with the port, the collar, and an alignment feature.

4. The system of any one of claims 1 to 3 wherein the insert further comprises a tube stub and the insert receiving cavity comprises an entry portion and an insert portion.

5. The system of claim 4 wherein the tube stub extends through the entry portion of the insert receiving cavity.

6. The system of claim 4 or claim 5 wherein the insert comprises a longitudinal axis and wherein the entry portion of the insert receiving cavity constrains motion of the insert about the longitudinal axis.

7. The system of any one of claims 1 to 6 wherein the insert receiving cavity comprises a flange receiving surface, a first collar receiving surface, and a perimeter surface extending between the flange receiving surface and the first collar receiving surface, each of the flange receiving surface, the first collar receiving surface, and the perimeter surface in physical contact with the insert; and wherein the insert further comprises a collar, the flange receiving surface receives a flange surface of the port of the insert, the first collar receiving surface receives a first collar surface of the collar, and the perimeter surface receives an outer diameter of the insert, the outer diameter of the insert extending from the first collar surface of the collar to the flange surface of the port.

8. The system of any one of claims 1 to 7 wherein the insert comprises an alignment feature and the insert receiving cavity comprises an alignment slot, the alignment feature positioned within the alignment slot.

9. A system for processing articles, the system comprising:

a fluid supply configured to supply a process fluid;

a process chamber configured to process articles; and

a fluid delivery module, the fluid delivery module comprising:

an inlet fluidly coupled to the fluid supply;

an outlet fluidly coupled to the process chamber;

a flow passage extending from the inlet to the outlet;

a substrate panel;

a first component for controlling flow, the first component comprising a housing comprising an insert receiving cavity, an insert located within the insert receiving cavity, the insert comprising a first port, the first port comprising an insert seal cavity, the insert seal cavity comprising a circumferential groove, the first component further comprising a second port comprising a seal cavity and a first flow path extending from the first port to the second port, the first flow path forming a first portion of the flow passage;

a plurality of substrate blocks, a first substrate block of the plurality of substrate blocks comprising a block seal cavity and a second flow path, the second flow path forming a second portion of the flow passage, the block seal cavity comprising a block port and a circumferential groove extending around the block port; and

a seal positioned within the insert seal cavity and the block seal cavity, wherein the seal comprises a first flange extending into the circumferential

groove of the insert seal cavity and a second flange extending into the circumferential groove of the block seal cavity;

wherein the plurality of substrate blocks are in contact with the substrate panel and the first component is coupled to the substrate panel and the first substrate block.

10. The system of claim 9 wherein the insert receiving cavity comprises an entry portion and an insert portion.

11. The system of claim 10 wherein the insert comprises a longitudinal axis and wherein the entry portion of the insert receiving cavity constrains motion of the insert about the longitudinal axis.

12. The system of any one of claims 9 to 11 wherein the port of the insert comprises a flange surface opposite a distal surface and a port outer diameter extending between the distal surface and the flange surface.

13. The system of any one of claims 9 to 12 wherein the insert comprises an alignment feature and the insert receiving cavity comprises an alignment slot, the alignment feature positioned within the alignment slot.

14. A fluid delivery module, comprising:

an inlet configured to be placed in fluid communication with a fluid supply;

an outlet configured to be placed in fluid communication with a process chamber;

a flow passage extending from the inlet to the outlet;

a substrate panel;

a flow control component for controlling flow in the flow passage, the flow control component comprising:

a first port comprising a component seal cavity;

a second port; and

a component flow path extending from the first port to the second port, the component flow path forming a portion of the flow passage;

a first substrate block mounted to the substrate panel, the first substrate block comprising:

a housing comprising an insert receiving cavity; and

an insert positioned in the insert receiving cavity, the insert comprising:

an insert seal cavity; and

an insert flow path, the insert flow path forming a portion of the flow passage;

a second substrate block mounted to the substrate panel, wherein the flow control component is mounted to the first substrate block and the second substrate block; and

a seal positioned within the component seal cavity and the insert seal cavity.

15. The fluid delivery module of claim 14, wherein the component seal cavity comprises a circumferential groove, wherein the insert seal cavity comprises a circumferential groove, wherein the seal comprises a first flange extending into the circumferential groove of the component seal cavity, and wherein the seal comprises a second flange extending into the circumferential groove of the insert seal cavity.