

CLAIMS:

1. A substrate processing system comprising:
a chamber body defining a transfer region;
a lid plate seated on the chamber body, wherein the lid plate defines a first
5 plurality of apertures through the lid plate and a second plurality of apertures through the lid
plate; and
a plurality of lid stacks equal to a number of apertures of the first plurality of
apertures defined through the lid plate, wherein the plurality of lid stacks at least partially define
a plurality of processing regions vertically offset from the transfer region, and wherein each lid
10 stack of the plurality of lid stacks comprises:
a choke plate seated on the lid plate along a first surface of the choke
plate, wherein the choke plate defines a first aperture axially aligned with an associated
aperture of the first plurality of apertures, and wherein the choke plate defines a second
aperture axially aligned with an associated aperture of the second plurality of apertures,
15 a pumping liner seated on a second surface of the choke plate opposite the
first surface of the choke plate, and
a faceplate seated on the pumping liner.
2. The substrate processing system of claim 1, wherein the choke plate
comprises a rim defining the first aperture, wherein the rim extends along a sidewall of the lid
20 plate defining the associated aperture of the first plurality of apertures.
3. The substrate processing system of claim 1, wherein the associated
aperture of the second plurality of apertures defined through the lid plate and the second aperture
defined through the choke plate form a flow channel extending from the pumping liner.
4. The substrate processing system of claim 1, wherein the transfer region
25 comprises a transfer apparatus rotatable about a central axis and configured to engage substrates
and transfer substrates among a plurality of substrate supports within the transfer region.
5. The substrate processing system of claim 1, further comprising:
a blocker plate seated on the faceplate.

6. The substrate processing system of claim 5, further comprising:
a faceplate heater seated on the faceplate and positioned radially outward of the blocker plate.

7. The substrate processing system of claim 5, wherein the blocker plate
5 defines a first plurality of protrusions extending vertically from a first surface of the blocker plate, and wherein the blocker plate is seated on the faceplate on the first plurality of protrusions.

8. The substrate processing system of claim 7, further comprising:
a gasbox seated on the blocker plate, where the blocker plate defines a second
plurality of protrusions extending vertically from a second surface of the blocker plate opposite
10 the first surface of the blocker plate, and wherein the gasbox is seated on the blocker plate on the second plurality of protrusions.

9. The substrate processing system of claim 8, wherein each protrusion of the second plurality of protrusions is vertically aligned with a protrusion of the first plurality of protrusions.

10. The substrate processing system of claim 1, wherein the choke plate
15 defines a first set of protrusions extending from a first surface of the choke plate, wherein the choke plate is seated on the lid plate on the first set of protrusions, wherein the choke plate defines a second set of protrusions extending from a second surface of the choke plate, and wherein the pumping liner is seated on the choke plate on the second set of protrusions.

11. The substrate processing system of claim 10, wherein the choke plate
20 defines a first channel in the second surface of the choke plate radially inward of the second set of protrusions, and wherein the choke plate defines a second channel in the second surface of the choke plate radially outward of the second set of protrusions.

12. The substrate processing system of claim 10, wherein the first set of
25 protrusions and the second set of protrusions extend radially about the first aperture defined through the choke plate.

13. The substrate processing system of claim 12, wherein the second aperture defined through the choke plate is laterally offset from the first aperture defined through the choke plate.

14. A substrate processing chamber choke plate comprising:
5 a plate defining a first aperture through the plate and a second aperture through the plate, wherein:

the second aperture is laterally offset from the first aperture,
the plate defines a first set of protrusions extending from a first surface of the plate,

10 the plate defines a second set of protrusions extending from a second surface of the plate opposite the first surface of the plate, and

the first set of protrusions and the second set of protrusions extend radially about the first aperture defined through the plate.

15 15. The substrate processing chamber choke plate of claim 14, wherein the plate comprises a rim defining the first aperture, and wherein the rim extends vertically from the first surface of the plate.

16. The substrate processing chamber choke plate of claim 14, wherein the first set of protrusions comprise an arcuate protrusion extending about the first aperture at a location about the first aperture distal to a location about the first aperture adjacent the second aperture defined through the plate.

17. The substrate processing chamber choke plate of claim 14, wherein the second set of protrusions comprise an arcuate protrusion extending about the first aperture at a location about the first aperture distal to a location about the first aperture adjacent the second aperture defined through the plate, and wherein the arcuate protrusion of the first set of protrusions extends further about the first aperture than the arcuate protrusion of the second set of protrusions.

18. The substrate processing chamber choke plate of claim 14, wherein the first surface of the plate and the second surface of the plate are free of protrusions at a location about the first aperture adjacent the second aperture defined through the plate.

5 19. A substrate processing system comprising:
a processing chamber defining a processing region;
a pedestal configured to support a substrate within the processing region;
a choke plate defining a first aperture and a second aperture through the choke
plate, wherein the choke plate defines a set of protrusions extending from a surface of the choke
plate disposed radially about the first aperture;
10 a pumping liner seated on the choke plate;
a faceplate seated on the pumping liner; and
a blocker plate seated on the faceplate.

20. The substrate processing system of claim 19, wherein the blocker plate
defines a first plurality of protrusions extending vertically from a first surface of the blocker
15 plate, and wherein the blocker plate is seated on the faceplate on the first plurality of protrusions.