

WHAT IS CLAIMED IS:

- A1. A lift hoop, comprising:
a frame having a central opening;
a plurality of wafer support structures disposed on said frame, wherein each of said plurality of wafer support structures includes a base which is attached to said frame, and a finger which is attached to said base and which extends from said base in the direction of said central opening;
a protrusion disposed on said finger; and
a stop disposed upon said finger and spaced apart from said protrusion, said stop having a non-planar surface which faces the central opening and which contains a point that forms the shortest distance between said stop and said protrusion.
- A2. The lift hoop of claim A1, wherein said fingers extend over said central opening.
- A3. The lift hoop of claim A1, wherein said central opening is circular.
- A4. The lift hoop of claim A3, wherein the central opening has a circumference, and wherein the protrusion and stop are disposed within a right cylinder containing the circumference.
- A5. The lift hoop of claim A1, wherein each of said plurality of wafer support structures is removably attached to said frame.
- A6. The lift hoop of claim A1, wherein said hoop is equipped with a rim having a planar surface, and wherein said wherein each of said plurality of wafer support structures is removably attached to said planar surface.
- A7. The lift hoop of claim A1, wherein said stop is beveled.

A8. The lift hoop of claim A1, wherein said non-planar surface of said stop is a faceted surface that includes a first facet which is disposed between second and third facets.

A9. The lift hoop of claim A8, wherein said first facet is contiguous to said second and third facets.

A10. The lift hoop of claim A1, wherein said non-planar surface of said stop is rounded.

A11. The lift hoop of claim A1, wherein said non-planar surface of said stop is semi-cylindrical.

A12. The lift hoop of claim A1, wherein each of said fingers has a proximal end portion which is attached to said base and a distal end which is spaced apart from said proximal end portion, and wherein said protrusion is disposed on said distal end portion.

A13. The lift hoop of claim A12, wherein said protrusion is a hemispherical protrusion.

A14. The lift hoop of claim A12, wherein said protrusion is a ridge having an axis which is parallel to a longitudinal axis of said finger.

A15. The lift hoop of claim A1, wherein said stop has a faceted surface.

A16. In combination with the lift hoop of claim A1, a semiconductor processing chamber which is equipped with a heating element and a pedestal, wherein said lift hoop is releasably attached to said heating element.

A17. The combination of claim A16, wherein said lift hoop is releasably attached to said heating element with a plurality of threaded fasteners.

A18. The lift hoop of claim A1, wherein said finger is mounted on said base with threaded fasteners.

A19. The lift hoop of claim A1, wherein said lift hoop provides a wafer capture area having a diameter greater than 301 mm.

A20. The lift hoop of claim A1, wherein said lift hoop provides a wafer capture area having a diameter greater than 303 mm.

A21. The lift hoop of claim A1, wherein said lift hoop provides a wafer capture area having a diameter greater than 304 mm.

A22. The lift hoop of claim A1, in combination with a semiconductor wafer, wherein said lift hoop provides a wafer capture area having a diameter that exceeds the diameter of the wafer by at least 1 mm.

A23. The lift hoop of claim A1, in combination with a semiconductor wafer, wherein said lift hoop provides a wafer capture area having a diameter that exceeds the diameter of the wafer by at least 3 mm.

A24. The lift hoop of claim A1, in combination with a semiconductor wafer, wherein said lift hoop provides a wafer capture area having a diameter that exceeds the diameter of the wafer by at least 4 mm.

B1. A method for making a lift hoop, comprising:
providing a frame having a central opening therein;

thermally annealing the frame while applying pressure to the frame; and
releasably attaching a plurality of wafer support structures to said frame, wherein each of said plurality of wafer support structures includes (a) a base which is removably attached to said frame, (b) a finger which is attached to said base and which extends from said base in the direction of said central opening, (c) a protrusion disposed on said finger, and (d) a stop disposed upon said finger and spaced apart from said protrusion.

B2. The method of claim B1, wherein the lift hoop is used in a degassing process, and wherein thermally annealing the frame includes subjecting the frame to a thermal cycle that includes the thermal cycle used in the degassing process.

B3. The method of claim B1, wherein thermally annealing the frame while applying pressure to the frame includes subjecting the frame to a thermal cycle while applying pressure to the frame with a set of clamps.

B4. The method of claim B1, wherein said stop has a non-planar surface which faces said central opening and which contains a point that forms the shortest distance between said stop and said protrusion.

C1. A method for aligning an end effector blade with a degas chamber, comprising:
providing an end effector blade with a keying aperture disposed therein;
providing a degas chamber having a lift hoop and heater pedestal, wherein said heater pedestal has a flattened surface with a centrally located aperture therein, and wherein said lift hoop includes a frame with a central opening therein, and a plurality of wafer support structures disposed on said frame, wherein each of said plurality of wafer support structures includes a base which is attached to said frame, and a finger which is attached to said base and which extends from said base in the direction of said central opening, and wherein each of said plurality of wafer support structures further includes a protrusion disposed on said finger;

providing a fixture having a central hub with a plurality of arms extending therefrom, wherein said hub has a central aperture therein, and wherein each of said plurality of arms has a peripheral aperture in a terminal portion thereof;

placing said fixture on said lift hoop such that each of said peripheral apertures engages a protrusion of one of said fingers, and such that the central aperture in said fixture is coaxially aligned with the centrally located aperture in said heater pedestal; and

manipulating the position of the end effector until a pin inserted through the central aperture in said hub passes through the keying aperture in said end effector blade and into the centrally located aperture in said heater pedestal.

C2. The method of claim C1, wherein said flattened surface of said heater pedestal has a geometric center, and wherein said centrally located aperture is disposed at the geometric center of said flattened surface.

C3. The method of claim C1, wherein said fingers extend over said central opening.

C4. The method of claim C1, wherein said central opening is circular.

C5. The method of claim C4, wherein the central opening has a circumference, and wherein the protrusion and stop are disposed within a right cylinder containing the circumference.

C6. The method of claim C1, wherein each of said plurality of wafer support structures is removably attached to said frame.

C7. The method of claim C1, wherein said hoop is equipped with a rim having a planar surface, and wherein said wherein each of said plurality of wafer support structures is removably attached to said planar surface.

- C8. The method of claim C1, wherein said stop is beveled.
- C9. The method of claim C1, wherein said non-planar surface of said stop is a faceted surface that includes a first facet which is disposed between second and third facets.
- C10. The method of claim C9, wherein said first facet is contiguous to said second and third facets.
- C11. The method of claim C1, wherein said non-planar surface of said stop is rounded.
- C12. The method of claim C1, wherein said non-planar surface of said stop is semi-cylindrical.
- C13. The method of claim C1, wherein each of said fingers has a proximal end portion which is attached to said base and a distal end which is spaced apart from said proximal end portion, and wherein said protrusion is disposed on said distal end portion.
- C14. The method of claim C13, wherein said protrusion is a hemispherical protrusion.
- C15. The method of claim C13, wherein said protrusion is a ridge having an axis which is parallel to a longitudinal axis of said finger.
- C16. The method of claim C1, wherein said stop has a faceted surface.
- C17. The method of claim C1, wherein said lift hoop is releasably attached to said heating element.
- C18. The method of claim C17, wherein said lift hoop is releasably attached to said heating element with a plurality of threaded fasteners.

C19. The method of claim C1, wherein said finger is mounted on said base with threaded fasteners.

C20. The method of claim C1, wherein said lift hoop provides a wafer capture area having a diameter greater than 301 mm.

C21. The method of claim C1, wherein said lift hoop provides a wafer capture area having a diameter greater than 303 mm.

C22. The method of claim C1, wherein said lift hoop provides a wafer capture area having a diameter greater than 304 mm.

C23. The method of claim C1, further comprising:
using the degas chamber to treat a semiconductor wafer;
wherein said lift hoop provides a wafer capture area having a diameter that exceeds the diameter of the wafer by at least 1 mm.

C24. The method of claim C23, wherein said lift hoop provides a wafer capture area having a diameter that exceeds the diameter of the wafer by at least 3 mm.

C25. The method of claim C23, wherein said lift hoop provides a wafer capture area having a diameter that exceeds the diameter of the wafer by at least 4 mm.