A wafer carrier used for shipping wafers, such as a FOSB or MAC generally includes wafer supports that lift the wafers during wafer shipment. If the wafer shipping carrier is then repurposed for use in a FAB, it is no longer desirable for the wafer to be stored in a lifted position.

There are several drawbacks associated with prior wafer handling devices or containers related to these issues. In one prior art approach, the wafer backstop is integrated into wafer support. Therefore, the backstop is made from the same material as the wafer support. The wafer support is comprised of a low wear, rigid material. Although the wafer support is designed to endure the contact stresses generated by the retention of the wafer, the backstop will wear over time due to forces normally generated during transport.

In another prior art approach, the wafer backstop is overmolded onto the wafer support and is a different material than the wafer support. The overmolded material has high wear resistance and is rigid. Here, although the wafer support backstop is designed to endure the contact stresses generated by the retention of the wafer, the backstop will still wear over time due to forces typically generated during transport.

Accordingly, a need in the industry exists for a wafer container that addresses one or more of these problems, particularly as they exist relative to containers for 450 mm diameter and larger wafers.

SUMMARY OF THE INVENTION

According to a first aspect of the present invention, there is provided a front opening container for large diameter semiconductor wafers comprising: an enclosure portion including a top wall, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side wall, a back wall, and a door frame opposite the back wall, the door frame defining a front opening, and wafer support structure including two side wafer supports, each side wafer support comprising a plurality of spaced vertically aligned wafer shelves, one side wafer support positioned at the left side wall and one positioned at the right side wall, each side wafer support having rearwardly positioned attachment structure for receiving a backstop; a pair of wafer backstops each having cooperating attachment structure for attachment to the rearwardly positioned attachment structure of

each of the wafer support structures, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves; wherein one of the pair of wafer backstops and the two side wafer supports has a plurality of horizontally extending tabs and the other has a plurality of horizontally extending slots configured to receive the tabs.

According to a second aspect of the present invention, there is provided a front opening container for large diameter semiconductor wafers comprising: an enclosure portion including a top wall, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side wall, a back wall, and a door frame opposite the back wall, the door frame defining a front opening, and wafer support structure including two side wafer supports, each side wafer support comprising a plurality of spaced vertically aligned wafer shelves, one side wafer support positioned at the left side wall and one positioned at the right side wall, each side wafer support having rearwardly positioned attachment structure for receiving a backstop; a pair of wafer backstops each having cooperating attachment structure for attachment to the rearwardly positioned attachment structure of each of the wafer support structures, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves, wherein each of the plurality of vertically aligned wafer engagement surfaces is positioned at an angle measured from an axial center of wafers seated in the enclosure portion of 40 to 50 degrees from a vertical plane extending directly rearwardly from said axial center.

According to a third aspect of the present invention, there is provided a front opening container for large diameter semiconductor wafers comprising: an enclosure portion including a top wall, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side wall, a back wall, and a door frame opposite the back wall, the door frame defining a front opening, and wafer support structure including two side wafer supports, each side wafer support comprising a plurality of spaced vertically aligned wafer shelves, one side wafer support positioned at the left side wall and one positioned at the right side wall, each side wafer support having rearwardly positioned attachment structure for receiving a backstop; a pair of wafer backstops each having cooperating attachment structure for attachment to the rearwardly positioned attachment structure of each of the wafer support structures, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves,

wherein the pair of wafer backstops each have a plurality of upright wafer engagement surfaces aligned with and transverse to a plurality of top surfaces of the plurality of shelves and the wafer engagement surfaces are positioned to center the wafers on the plurality of wafer shelves for robotic pickup.

According to a fourth aspect of the present invention, there is provided a front opening container for containing a plurality of large diameter semiconductor wafers, the container comprising: an enclosure portion having an open interior and comprising a top wall adapted to receive a robotic flange, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side wall, a back wall, a door frame opposite the back wall, the door frame defining a front opening, and two side wafer supports positioned in the enclosure portion, one associated with the left side wall and one associated with the right side wall; each side wafer support comprising a plurality of spaced vertically aligned wafer shelves defining slots for the large diameter semiconductor wafers, each side wafer support having a forward portion and a rearward portion; a pair of wafer backstops removably attached to the rearward end of each of the two side wafer supports, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves and defining the backside of the wafer slots; and a door with a latch mechanism, configured to sealingly close the front opening, the door comprising a wafer cushion for engaging the plurality of large diameter wafers; wherein one of the pair of wafer backstops and the two side wafer supports has a plurality of horizontally extending tabs and the other has a plurality of horizontally extending slots configured to receive the tabs.

According to a fifth aspect of the present invention, there is provided a front opening container for containing a plurality of large diameter semiconductor wafers, the container comprising: an enclosure portion having an open interior and comprising a top wall adapted to receive a robotic flange, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side wall, a back wall, a door frame opposite the back wall, the door frame defining a front opening, and two side wafer supports positioned in the enclosure portion, one associated with the left side wall and one associated with the right side wall; each side wafer support comprising a plurality of spaced vertically aligned wafer shelves defining slots for the large diameter semiconductor wafers, each side wafer support having a forward portion and a rearward portion; a pair of wafer backstops

removably attached to the rearward end of each of the two side wafer supports, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves and defining the backside of the wafer slots; and a door with a latch mechanism, configured to sealingly close the front opening, the door comprising a wafer cushion for engaging the plurality of large diameter wafers; wherein each of the pair of wafer backstops engage the respective wafer support at a plurality of vertically aligned stop surfaces of the wafer support that are each in substantial radial alignment with a respective wafer engagement surface of the respective wafer backstop.

Embodiments of the invention address the need of the industry for a wafer container that reduces or alleviates one or more of the problems associated with excessive container wall wear and deformation induces by transport of wafer containers, particularly as those problems are experienced with containers for 450 mm diameter and larger wafers.

~~A~~Disclosed herein is a wafer container an enclosure portion including a top wall, a bottom wall, a pair of side walls, a back wall, and a door frame opposite the back wall, the door frame defining a front opening, and a wafer support structure including two side wafer supports 5 each side wafer support including a removable backstop. ~~The~~Embodiments of the invention includes maintaining wafer containers by replacing the removable backstop. ~~The~~Embodiments of the invention

includes converting shipping containers that ship large diameter wafers vertically to containers to be used in fabrication facilities that store wafers horizontally for robotic pickup for processing.

In an embodiment, a front opening wafer container suitable for large diameter wafers uses a wafer backstop that is replaceable and that is formed from a material that has a different modulus than the material that the wafer support shell is formed from. The wafer backstop is formed of a material that has greater wear resistance than the material of the wafer support. The backstop of the present invention is replaceable and includes snap fit style spring members that facilitate removal, replacement and assembly of the backstop within the wafer container shell.

In embodiments of the invention the removable backstops engage the wafers at a position about 40 degrees to about 50 degrees each of left and right of rear center. A feature and advantage is that this is an ideal position for centering the wafer for robotic retrieval.

According to one embodiment of the invention, a carrier configured for shipping wafers can be configured for transport and storage within a FAB, for example by adding the backstop to each of the side wafer supports. In embodiments, the configuring can also include removal of wafer cushions within the container intended just for shipping; for example, removable cushions at the rear of the container portion, removable cushions at the left front and right front regions forward of the left and right side wafer supports.

An advantage and feature of embodiments of the invention is that a worn backstop can easily be replaced in the field.

An advantage and feature of embodiments of the invention is decreased operational costs because the backstop is replaceable. Instead of replacing an entire wafer support or carrier, only the backstop need be replaced. Currently the replacing of an entire wafer support due to the wear of an integrated backstop requires that the wafer plane associated with the carrier needs to be reaffirmed.

Another advantage of embodiments of the invention is that the radial position of the wafer can be moved to a new position by replacing the wafer backstop according to the present invention.

An advantage and feature of embodiments of the invention, especially for a 450 mm case, is that compared to a centrally located replaceable rear backstop, the position of the backstop of the invention located on the wafer support leads to more precise wafer position in the radial direction. Assuming equivalent assembly tolerances, geometric relationships dictate that while rear backstop placement leads to precise wafer position in the y-direction (front to back), it leads to less precise wafer position in x-direction (left to right). The position of the wafer support backstop according to the invention is optimal due to its position balanced between the rear and the side of the carrier.

An advantage and feature of embodiments of the invention is that a wafer backstop of a wafer support permanently deforms when wafer retention forces are applied. If the wafer backstop is replaceable then it can also be manufactured using a different material than the wafer support. For example, if the wafer support is comprised of a low modulus material, the replaceable backstop can be formed of a higher modulus material that also has a higher yield strength.

A feature and advantage of embodiments of the invention is that the wafer contact surfaces of the backstop are in close proximity to a plurality of positioning stop surfaces and locking members to provide repeatability in wafer positioning when the backstop is replaced. The close proximity minimizes errors such as due to molding deviations or slight misalignments. In an embodiment the wafer contact surfaces are within 1.5 cm of a positioning stop surface. In embodiments within 1 cm. In embodiments, within 2 cm.

A feature and advantage of embodiments is that the positioning of the backstop is off of the smaller component, the wafer supports, rather than the prior art alternative, the larger expansive less precise shell portion. The side wafer supports are already required to be precisely positioned to a high degree of accuracy due to the robotic wafer pick up requirements. The back side of the shell, where the prior art wafer stops may be located, do not have the precise positioning requirements and the existence of the vast expanses of polymer in the walls make positioning the stops off of same less precise.

Assuming contact stress associated with the applied wafer retention is less than the yield strength of the material, permanent deformation will not occur in the backstop of embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The embodiments of the present invention may be more completely understood in consideration of the following detailed description of various embodiments in connection with the accompanying drawings, in which:

Figure 1 is an exploded front isometric view of a front-opening wafer container according to an embodiment of the invention;

Figure 2 is an exploded isometric view of an embodiment of a wafer support assembly for the container of Figure 1;

Figure 3 is an assembled isometric view of an embodiment of a wafer support assembly of Figure 2 for the container of Figure 1;

Figure 4 is an assembled isometric view of an embodiment of a wafer support assembly of Figure 2 for the container of Figure 1 according to another embodiment of the invention;

Figure 5 is a front elevational view of a wafer container according to an embodiment of the invention;

Figure 6 is cross sectional view of the wafer container of Figure 5 taken on section line 6-6 of Figure 5;

Figure 7 is a front elevational view of a wafer container according to an embodiment of the invention;

Figure 8 is a cross-sectional view taken on section line 8-8 of Figure 7;

Figure 9 is a front elevational view of a wafer container according to an embodiment of the invention;

CLAIMS:

1. A front opening container for large diameter semiconductor wafers comprising:

an enclosure portion including a top wall, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side wall, a back wall, and a door frame opposite the back wall, the door frame defining a front opening, and

wafer support structure including two side wafer supports, each side wafer support comprising a plurality of spaced vertically aligned wafer shelves, one side wafer support positioned at the left side wall and one positioned at the right side wall, each side wafer support having rearwardly positioned attachment structure for receiving a backstop;

a pair of wafer backstops each having cooperating attachment structure for attachment to the rearwardly positioned attachment structure of each of the wafer support structures, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves;

wherein one of the pair of wafer backstops and the two side wafer supports has a plurality of horizontally extending tabs and the other has a plurality of horizontally extending slots configured to receive the tabs.

2. The front opening container for large diameter semiconductor wafers of claim 1 wherein the plurality of horizontally extending tabs includes a plurality of spring catches to releasably lock the pair of backstops to the two side wafer supports.

3. The front opening container for large diameter semiconductor wafers of claim 1 in combination with a plurality of 450 mm wafers seated on the plurality of wafer shelves.

4. A front opening container for large diameter semiconductor wafers comprising:

an enclosure portion including a top wall, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side wall, a back wall, and a door frame opposite the back wall, the door frame defining a front opening, and

wafer support structure including two side wafer supports, each side wafer support comprising a plurality of spaced vertically aligned wafer shelves, one side wafer support

positioned at the left side wall and one positioned at the right side wall, each side wafer support having rearwardly positioned attachment structure for receiving a backstop;

a pair of wafer backstops each having cooperating attachment structure for attachment to the rearwardly positioned attachment structure of each of the wafer support structures, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves,

wherein each of the plurality of vertically aligned wafer engagement surfaces is positioned at an angle measured from an axial center of wafers seated in the enclosure portion of 40 to 50 degrees from a vertical plane extending directly rearwardly from said axial center.

5. A front opening container for large diameter semiconductor wafers comprising:

an enclosure portion including a top wall, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side wall, a back wall, and a door frame opposite the back wall, the door frame defining a front opening, and

wafer support structure including two side wafer supports, each side wafer support comprising a plurality of spaced vertically aligned wafer shelves, one side wafer support positioned at the left side wall and one positioned at the right side wall, each side wafer support having rearwardly positioned attachment structure for receiving a backstop;

a pair of wafer backstops each having cooperating attachment structure for attachment to the rearwardly positioned attachment structure of each of the wafer support structures, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves,

wherein the pair of wafer backstops each have a plurality of upright wafer engagement surfaces aligned with and transverse to a plurality of top surfaces of the plurality of shelves and the wafer engagement surfaces are positioned to center the wafers on the plurality of wafer shelves for robotic pickup.

6. The front opening container for large diameter semiconductor wafers of claim 5 wherein each of the pair of wafer backstops engage the respective wafer support at a plurality of vertically aligned stop surfaces of the wafer support that are each in substantial radial alignment with a respective wafer engagement surface of the respective wafer backstop.

7. A front opening container for containing a plurality of large diameter semiconductor wafers, the container comprising:

an enclosure portion having an open interior and comprising a top wall adapted to receive a robotic flange, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side wall, a back wall, a door frame opposite the back wall, the door frame defining a front opening, and

two side wafer supports positioned in the enclosure portion, one associated with the left side wall and one associated with the right side wall; each side wafer support comprising a plurality of spaced vertically aligned wafer shelves defining slots for the large diameter semiconductor wafers, each side wafer support having a forward portion and a rearward portion;

a pair of wafer backstops removably attached to the rearward end of each of the two side wafer supports, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves and defining the backside of the wafer slots: and

a door with a latch mechanism, configured to sealingly close the front opening, the door comprising a wafer cushion for engaging the plurality of large diameter wafers;

wherein one of the pair of wafer backstops and the two side wafer supports has a plurality of horizontally extending tabs and the other has a plurality of horizontally extending slots configured to receive the tabs.

8. The front opening container for large diameter semiconductor wafers of claim 7 wherein the plurality of horizontally extending tabs includes a plurality of spring catches to releasably lock the pair of backstops to the two side wafer supports.

9. The front opening container for large diameter semiconductor wafers of claim 7 wherein the pair of wafer backstops is formed of a material different than that of the two side wafer supports.

10. The front opening container for large diameter semiconductor wafers of claim 7 wherein the pair of wafer backstops each have a plurality of upright wafer engagement surfaces aligned with and transverse to a plurality of top surfaces of the plurality of shelves and the wafer

engagement surfaces are positioned to center the wafers on the plurality of wafer shelves for robotic pickup.

11. A front opening container for containing a plurality of large diameter semiconductor wafers, the container comprising:

an enclosure portion having an open interior and comprising a top wall adapted to receive a robotic flange, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side wall, a back wall, a door frame opposite the back wall, the door frame defining a front opening, and

two side wafer supports positioned in the enclosure portion, one associated with the left side wall and one associated with the right side wall; each side wafer support comprising a plurality of spaced vertically aligned wafer shelves defining slots for the large diameter semiconductor wafers, each side wafer support having a forward portion and a rearward portion;

a pair of wafer backstops removably attached to the rearward end of each of the two side wafer supports, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves and defining the backside of the wafer slots; and

a door with a latch mechanism, configured to sealingly close the front opening, the door comprising a wafer cushion for engaging the plurality of large diameter wafers;

wherein each of the pair of wafer backstops engage the respective wafer support at a plurality of vertically aligned stop surfaces of the wafer support that are each in substantial radial alignment with a respective wafer engagement surface of the respective wafer backstop.

12. The front opening container for large diameter semiconductor wafers of claim 11 in combination with a plurality of 450 mm wafers in the plurality of slots.

CLAIMS

What is claimed is:

1. A front opening container for large diameter semiconductor wafers comprising:

an enclosure portion including a top wall, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side walls, a back wall, and a door frame opposite the back wall, the door frame defining a front opening, and

wafer support structure including two side wafer supports, each side wafer support comprising a plurality of spaced vertically aligned wafer shelves, one side wafer support positioned at the left side wall and one positioned at the right side wall, each side wafer support having rearwardly positioned attachment structure for receiving a backstop;

a pair of wafer backstops each having cooperating attachment structure of attachment to the rearward attachment structure of each of the wafer support structures, each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves.

2. The front opening container for large diameter semiconductor wafers of claim 1 wherein one of the pair of wafer backstops and the pair of wafer supports has a plurality of horizontally extending tabs and the other has a plurality of horizontally extending slots configured to receive the tabs.

3. The front opening container for large diameter semiconductor wafers of claim 2 wherein the plurality of horizontally extending tabs includes a plurality spring catches to releasably lock the pair of backstops to the pair of wafer supports.

4. The front opening container for large diameter semiconductor wafers of claim 1 wherein each of the plurality of vertically aligned wafer engagement surfaces is positioned at an angle measured from axial center of wafers seated in the container portion of 40 to 50 degrees from a vertical plane extending directly rearwardly form said axial center.

5. The front opening container for large diameter semiconductor wafers of claim 1 wherein the pair of wafer backstops each have a plurality of upright wafer engagement

surfaces aligned with and transverse to a plurality of top surfaces of the plurality of shelves and the wafer engagement surfaces are positioned to center the wafers on the plurality of wafer shelves for robotic pickup.

6. The front opening container for large diameter semiconductor wafers of claim 5 wherein each of the pair of wafer backstops engage the respective wafer support at a plurality of vertically aligned stop surfaces of the wafer support that are each in substantial radial alignment with a respective wafer engagement surface of the respective wafer backstop.

7. The front opening container for large diameter semiconductor wafers of any of the above claims in combination with a plurality of 450 mm wafers seated on the plurality of wafer shelves.

8. A front opening container for containing a plurality of large diameter semiconductor wafers, the container comprising:

an enclosure portion having an open interior and comprising a top wall adapted to receive a robotic flange, a bottom wall with a kinematic coupling disposed thereon, a left side wall and a right side walls, a back wall, a door frame opposite the back wall, the door frame defining a front opening, and

two side wafer supports positioned in the enclosure portion, one associated with the left side wall and one associated with the right side wall; each side wafer support comprising a plurality of spaced vertically aligned wafer shelves defining slots for the large diameter semiconductor wafers, one side wafer support positioned at the left side wall and one side wafer support positioned at the right side wall, each side wafer support having a forward portion and a rearward portion;

a pair of wafer backstops removably attached to the rearward end of each of the two side wafer supports , each wafer backstop having a plurality of vertically aligned wafer engagement surfaces corresponding to each of the plurality of wafer shelves and defining the backside of the wafer slots; and

a door with a latch mechanism, configured to sealingly close the open front, the door comprising a wafer cushion for engaging the plurality of large diameter wafers.

9. The front opening container for large diameter semiconductor wafers of claim 8 wherein one of the pair of wafer backstops and the pair of wafer supports has a plurality of horizontally extending tabs and the other has a plurality of horizontally extending slots configured to receive the tabs.

10. The front opening container for large diameter semiconductor wafers of claim 8 wherein the plurality of horizontally extending tabs includes a plurality spring catches to releasably lock the pair of backstops to the pair of wafer supports.

11. The front opening container for large diameter semiconductor wafers of claim 8 wherein the pair of wafer backstops is formed of a material different than that of the pair of wafer supports.

12. The front opening container for large diameter semiconductor wafers of claim 8 wherein the pair of wafer backstops each have a plurality of upright wafer engagement surfaces aligned with and transverse to a plurality of top surfaces of the plurality of shelves and the wafer engagement surfaces are positioned to center the wafers on the plurality of wafer shelves for robotic pickup.

13. The front opening container for large diameter semiconductor wafers of claim 8 wherein each of the pair of wafer backstops engage the respective wafer support at a plurality of vertically aligned stop surfaces of the wafer support that are each in substantial radial alignment with a respective wafer engagement surface of the respective wafer backstop.

14. The front opening container for large diameter semiconductor wafers of any one of claims 8 through 13 in combination with a plurality of 450 mm wafers in the plurality of slots.

15. A method of maintaining a large diameter wafer container having a container portion with a front opening, a pair of wafer supports in the interior with shelves space apart about 450 mm for defining 450 mm wafer slots, the container having a a front opening for receiving a door, and a door, the method comprising:

removing a pair of backstops from the wafer supports, each backstop comprising a vertically extending elongate member with at least one attachment portion that cooperates with at least one attachment portion on each of the wafer supports; and

installing a pair of new backstops with attachment portions on the wafer supports.

16. The method of claim 15 wherein the removal of the backstops comprises releasing a plurality of spring catches on each backstop, the spring catches being unitary with each respective backstop

17. The method of claim 15 wherein the installing the pair of new backstops comprises flexing a plurality of spring catches on each backstop and latching the spring catches to the wafer supports.

18. The method of claim 15 wherein the removal of the pair of backstops comprises withdrawing a plurality of tabs nested in a plurality of slots.

19. A method of installing a pair of backstops on a pair of wafer supports in a front opening wafer container, the method comprising:

releasing a plurality of spring catches that are unitary with each backstop from engagement with cooperating portions on a pair of side wafer supports, urging each of the backstops inwardly in a direction aligned with the spring catches.

20. A method of centering large diameter wafers in a front opening wafer container, the wafers having a vertical axis and wherein an x-y-z coordinate plane associates the x axis as horizontal and left to right substantial normal to side walls of the container, the y axis is vertical, and the z axis is horizontal and directly rearward, the method comprising:

providing a pair of removable backstops attached to each of a pair of side wafer supports and positioning the removable backstops such that they engage wafers at an angle from a vertical plane in the z-y plane of about 40 to about 50 degrees on each side of the plane measured from a vertical axis.

21. A method of converting a large diameter wafer container having a container portion and a front opening with a door therein from a shipping mode to a mode for

storing wafers horizontally in a fabrication facility inbetween process steps, the method comprising:

removing a wafer engagement member from the container portion that has V-shaped grooves positioned for centering the wafers intermediate wafer shelves; and

installing a rearward wafer engagement member that has vertical wafer engaging stops in the container portion, the positioned to center the wafers on a plurality of wafer shelves in the container portion for robotic pickup.

22. The method of claim 21 wherein the rearward wafer engagement member is configured as a backstop removably attachable to a side wafer support comprising a plurality of the plurality of wafer shelves.

23. The method of claim 21 further comprising flexing a plurality of resilient spring catches that are unitary with the backstop and attaching the plurality of spring catches to a plurality of cooperating spring catch receiving portions whereby the backstop is locked in place.

24. The method of claim 21 wherein the removal of the wafer engagement member from the container portion that has V-shaped grooves comprises detaching the member from a rear wall of the container portion.

25. The method of claim 21 wherein the removal of the wafer engagement member from the container portion that has V-shaped grooves comprises detaching the member from a side wafer support.

26. A wafer backstop comprising an elongate wafer engagement portion with a plurality of wafer edge engagement surfaces substantially aligned with the longitudinal direction, a plurality of aligned tabs extending from the wafer engagement portion, a plurality of the tabs configures as spring catches with hook portions for engaging and releasably locking to wafer support structure.