

CLAIMS

We claim:

1. A front opening wafer container comprising:
a container portion comprising a shell portion, a door frame defining an open front, and,
a door sized to be received in the door frame, the door comprising a latch mechanism for latching the door to the container portion; and
a pair of wafer shelf components positioned in the container portion for defining a wafer receiving region, each of the wafer shelf components having a plurality of V-shaped seating portions defining V-shaped recesses with, wherein a strip of thin film comprising polybutylene terephthalate (PBT) polymer exposed on the seating portions for engaging wafer edges is abrasion resistant to the wafer edges.
- ~~2. The front opening wafer container of claim 1 wherein the container portion is sized for receiving 300mm wafers.~~
- ~~3. The front opening wafer container of claim 1 wherein each of the wafer shelf components further has a plurality of vertically arranged shelves, each of the shelves defining an on-shelf seating position.~~
- ~~4. The front opening wafer container of claim 3 further comprising a kinematic coupling on a bottom side of the container portion and a robotic flange on a top side of the container portion.~~
- ~~5. The front opening wafer container of claim wherein the strip of thin film is bonded to base material of the wafer shelf components, the base material comprising polycarbonate.~~
- ~~6. The front opening wafer container of claim 5 wherein the strip of thin film is bonded to the base material by way of an overmolding process.~~
- ~~7.~~ 72. A front opening wafer container comprising:
a container portion configured for receiving 300 mm or 450 mm wafers and having an open front and a set of stacked ramps configured for receiving the wafers, each of the ramps

leading to a between-shelf wafer seating position, and a pair of sets of shelves providing a plurality of on-shelf seating positions, and a door sized to be received by the container portion to close the open front, the door having a set of stacked ramps that cooperate with the set of stacked ramps in the container portion;

—wherein the set of stacked ramps of the container portion is formed of a polymer providing less sliding friction with respect to the edges of the wafers as compared to the stacked ramps of the door.

83. The front opening wafer container of claim 72, wherein the door has a plurality of discrete finger portions, each finger portion defining the set of stacked ramps of the door, polymer comprises polybutylene terephthalate, polyether ether ketone, polytetrafluoroethylene, perfluoroalkoxy alkane, or combinations thereof.

94. The front opening wafer container of claim 7, ~~wherein the set of stacked ramps comprises polybutylene terephthalate (PBT).~~

10. ~~The front opening wafer container of claim 9, wherein the PBT is in the form of a thin film bonded to a base material.~~

11. ~~The front opening wafer container of claim 102, wherein the base material is polycarbonate and the PBT is polymer is polybutylene terephthalate bonded to the polycarbonate by overmolding the polycarbonate on the PBT.~~

12. ~~The front opening wafer container of claim 7, wherein the discrete finger portions are comprised of polycarbonate.~~

13. ~~The front opening wafer container of claim 7, wherein each of the set of stacked ramps is formed by overmolding a polymer other than PBT onto PBT.~~

145. A front opening wafer container comprising a container portion with an open front and a door for closing the open front, the container portion comprising a plurality of shelves defining

on-shelf seating positions and a plurality of ramps defining an elevated between-shelves seating position, the shelf formed of a first polymer material and the plurality of ramps formed of a second polymer material.

156. The front opening wafer container of claim 135, wherein the plurality of shelves comprises a first stacked set of shelves on one side of the container portion and a second set of stacked shelves on a side opposing the one side of the container portion, wherein the plurality of ramps comprises a first set of stacked ramps on the one side of the container portion and a second set of stacked ramps on the opposing side of the container portion.

167. The front opening wafer container of claim 155, wherein the first set of stacked shelves and the first set of stacked ramps are unitary in a wafer shelf component, and the second set of stacked shelves and the second set of stacked ramps are unitary in another wafer shelf component polymer material comprises polybutylene terephthalate, polyether ether ketone, polytetrafluoroethylene, perfluoroalkoxy alkane, or combinations thereof.

17.8. The front opening wafer container of claim 155, wherein the first set of stacked shelves are unitary in a wafer shelf component, and the second set of stacked shelves are unitary in another wafer shelf component and the first set of stacked ramps and the second set of stacked ramps are not unitary with either the wafer shelf component or the another wafer shelf component polymer material comprises polybutylene terephthalate and the second polymer material comprises polycarbonate.

18. — The front opening wafer component of any of claims 14-17, wherein each set of stacked ramps is defined by a thin film strip of polybutylene terephthalate with an overmolded base portion.

199. A method of manufacturing a wafer container comprising:

———forming a pre-form from polybutylene terephthalate (PBT), polyether ether ketone, polytetrafluoroethylene, perfluoroalkoxy alkane, or combinations thereof that ~~comprises~~comprise a set of stacked ramps;

inserting the pre-form into a mold for a wafer shelf component;

—injecting polycarbonate a base material into the mold thereby overmolding the polycarbonate base material onto the PBT-pre-form to form a wafer shelf component;

removing the molded wafer shelf component ~~with the overmolded PBT~~ from the mold; and

installing the wafer shelf component into a container portion.

20. —The method of claim 19, comprising selecting a thin film strip for the PBT pre-form.

21. —~~The method of claim 19, comprising molding a forward set of stacked ramps of polycarbonate and installing said set of stacked ramps on a door sized for the container portion.~~

22. —~~The method of claim 19, comprising mechanically holding down the pre-form during the injecting of the polycarbonate.~~

23. —~~The method of claim 19, comprising injecting the polycarbonate from a gate positioned opposite a position of the preform in the mold with respect to the cavity.~~

CLAIMS

We claim:

1. A front opening wafer container comprising:
a container portion comprising a shell portion, a door frame defining an open front,
and,
a door sized to be received in the door frame, the door comprising a latch mechanism for latching the door to the container portion; and
a pair of wafer shelf components positioned in the container portion for defining a wafer receiving region, each of the wafer shelf components having a plurality of seating portions, wherein a polybutylene terephthalate polymer exposed on the seating portions for engaging wafer edges is abrasion resistant to the wafer edges.
2. A front opening wafer container comprising: a container portion configured for receiving 300 mm or 450 mm wafers and having an open front and a set of stacked ramps configured for receiving the wafers, each of the ramps leading to a between-shelf wafer seating position, and a pair of sets of shelves providing a plurality of on-shelf seating positions, and a door sized to be received by the container portion to close the open front, the door having a set of stacked ramps that cooperate with the set of stacked ramps in the container portion; wherein the set of stacked ramps of the container portion is formed of a polymer providing less sliding friction with respect to the edges of the wafers as compared to the stacked ramps of the door.
3. The front opening wafer container of claim 2, wherein the polymer comprises polybutylene terephthalate, polyether ether ketone, polytetrafluoroethylene, perfluoroalkoxy alkane, or combinations thereof.
4. The front opening wafer container of claim 2, wherein the base material is polycarbonate and the polymer is polybutylene terephthalate bonded to the polycarbonate by overmolding.
5. A front opening wafer container comprising a container portion with an open front and a door for closing the open front, the container portion comprising a plurality of shelves defining on-shelf seating positions and a plurality of ramps defining an elevated between-

shelves seating position, the shelf formed of a first polymer material and the plurality of ramps formed of a second polymer material.

6. The front opening wafer container of claim 5, wherein the plurality of shelves comprises a first stacked set of shelves on one side of the container portion and a second set of stacked shelves on a side opposing the one side of the container portion, wherein the plurality of ramps comprises a first set of stacked ramps on the one side of the container portion and a second set of stacked ramps on the opposing side of the container portion.

7. The front opening wafer container of claim 5, wherein the first polymer material comprises polybutylene terephthalate, polyether ether ketone, polytetrafluoroethylene, perfluoroalkoxy alkane, or combinations thereof.

8. The front opening wafer container of claim 5, wherein the first polymer material comprises polybutylene terephthalate and the second polymer material comprises polycarbonate.

9. A method of manufacturing a wafer container comprising:

forming a pre-form from polybutylene terephthalate, polyether ether ketone, polytetrafluoroethylene, perfluoroalkoxy alkane, or combinations thereof that comprise a set of stacked ramps;

inserting the pre-form into a mold for a wafer shelf component;

injecting a base material into the mold thereby overmolding the base material onto the pre-form to form a wafer shelf component;

removing the molded wafer shelf component from the mold; and

installing the wafer shelf component into a container portion.