

CLAIMS

1. A die handling system comprising
 - a first cassette configured to store prepared wafers comprising a wafer of a first configuration;
 - an expander configured to expand the wafers of the first configuration into a first pre-expanded wafer;
 - a pre-expanded wafer holding device configured to store the first pre-expanded wafer received from the expander; and
 - a die handler comprising a pick head configured to extract one or more dies from the first pre-expanded wafer.
2. The die handling system of claim 1, further comprising:
 - a second cassette configured to store second prepared wafers comprising a wafer of a second configuration, wherein properties of the second configuration are different from properties of the first configuration; and
 - a second pre-expanded wafer holding device configured to receive a second pre-expanded wafer from the expander.
3. The die handling system of claim 1, wherein the first pre-expanded wafer is maintained in a first cartridge comprising the wafer of the first configuration positioned between a top plate and bottom plate of the first cartridge.
4. The die handling system of claim 2, wherein the first pre-expanded wafer and the second pre-expanded wafer are stored in a pre-oriented position in the first pre-expanded wafer holding device or second pre-expanded wafer holding device.
5. The die handling system of claim 2 further comprising:
 - a first elevator attached to the pre-expanded wafer holding device;
 - a second elevator attached to the second pre-expanded wafer holding device; and
 - the die handler is connected to both the first elevator and the second elevator.
6. The die handling system of claim 2, wherein the pick head of the die handler concurrently extracts one or more dies from the first pre-expanded wafer while the expander expands the wafers or the wafers of the second configuration into a second pre-expanded wafer.

7. The die handling system of claim 1, further comprising:
a camera attached to the die handler, wherein the camera has a three dimensional view of each extracted die of the first pre-expanded wafer.
8. The die handling system of claim 7, wherein the three-dimensional view of the camera allows for a side view and an edge view of the one or more dies extracted from the first pre-expanded wafer.
9. The die handler of claim 1, wherein the pick head is rotatable.
10. The die handling system of claim 7, wherein the pick head rotates and presents each extracted die of the first pre-expanded wafer to the camera.
11. A die handling method comprising the steps of:
pulling a prepared wafer comprising a wafer of a first configuration from a cassette to an expander;
expanding the wafer to a pre-expanded wafer;
storing the pre-expanded wafer in a pre-expanded wafer holding device;
pulling the pre-expanded wafer from the pre-expanded wafer holding device to a table of a die handler; and
extracting one or more dies from of the pre-expanded wafer.
12. The die handling method of claim 11 further comprising the steps of:
pulling a second prepared wafer comprising a second wafer of a second configuration from a second cassette to the expander, wherein the second wafer has a different configuration than the wafer of the first configuration; and
expanding the second wafer to a second pre-expanded wafer.
13. The method of claim 12, further comprising the steps of:
storing the second pre-expanded wafer in a second pre-expanded wafer holding device;
and

pulling the second pre-expanded wafer from the second pre-expanded wafer holding device to the die handler.

14. The method of claim 11, wherein the step of expanding the prepared wafer into a pre-expanded wafer further comprises:

- preparing a cartridge comprising a top plate, bottom plate and the prepared wafer;
- layering the prepared wafer between the top plate and bottom plate of the cartridge;
- expanding the wafer by compressing the top plate and bottom plate together; and
- locking the top plate and bottom plate together, creating the pre-expanded wafer.

15. The method of claim 12, wherein the step of extracting one or more dies of the pre-expanded wafer and the step of expanding the second prepared wafer to a second pre-expanded wafer occur simultaneously.

16. The method of claim 11 further comprising the step of:
inspecting, by a vision system attached to the die handler, the one or more dies extracted from the pre-expanded wafer.

17. The method of claim 16, wherein the vision system provides a three dimensional view of the one or more dies extracted from the pre-expanded wafer.

18. The method of claim 16, wherein the inspecting step includes viewing, by a camera of the vision system, a side view or an edge view of the one or more dies extracted from the pre-expanded wafer.

19. The method of claim 11, wherein the step of storing the pre-expanded wafer in a pre-expanded wafer holding device further comprises the step of:

- rotating the pre-expanded wafer into a pre-orientated position; and
- placing the pre-expanded wafer into the pre-expanded wafer holding device in the pre-orientated position.

20. The method of claim 12, further comprising the steps of:
storing the second pre-expanded wafer in a second pre-expanded wafer holding device;

pulling the second pre-expanded wafer from the second pre-expanded wafer holding device to the table of the die handler; and

extracting one or more dies of the second pre-expanded wafer while concurrently extracting one or more dies from the first pre-expanded wafer.