CLAIMS

1. A cleaning method for a semiconductor storage container, characterized by comprising:

S21, placing a cleaned semiconductor storage container in a second cleaning chamber;

S22, vacuumizing the second cleaning chamber for a duration T_{S22}, so that a pressure value in the second cleaning chamber is less than or equal to a first preset pressure value, and maintaining a temperature in the second cleaning chamber between 40-80 °C;

S23, filling the second cleaning chamber with gas at a first average volumetric flow rate for a duration T_{S23}, and maintaining a maximum pressure value in the second cleaning chamber during step S23 to be less than or equal to a second preset pressure value, wherein the gas is clean dry compressed gas; and

S24, filling the second cleaning chamber with gas at a second average volumetric flow rate for a duration T_{S24}, and maintaining a maximum pressure value in the second cleaning chamber during step S24 to be less than or equal to a third preset pressure value, wherein the gas is clean dry compressed gas,

wherein the first average volumetric flow rate is less than the second average volumetric flow rate, and the maximum pressure value in the second cleaning chamber during step the S23 is less than the maximum pressure value in the second cleaning chamber during step the S24,

preferably, wherein the cleaning method further comprises:

detecting a contaminant level in the second cleaning chamber to obtain detection results, wherein the contaminant level comprises residual levels of one or more of SO_2, inorganic ammonia, VOC, organic ammonia, and acids; and

performing subsequent processing according to the detection results.

2. The cleaning method for a semiconductor storage container according to claim 1, wherein after the step S24, the cleaning method further comprises a step of:

S25, cycling the step S22, the step S23 and the step S24 for several times, wherein in each cycled step S22, a minimum pressure value in the second cleaning chamber is less than or equal to a minimum pressure value in the second cleaning chamber in a previous execution of step S22, and/or a duration of vacuumizing the second cleaning

chamber is less than or equal to a duration of vacuumizing the second cleaning chamber in the previous execution of step S22.

3. The cleaning method for a semiconductor storage container according to claim 1, wherein after the step S24, the cleaning method further comprises a step of:

S25, cycling the step S22, the step S23 and the step S24 for several times, wherein in each cycled step S22, a minimum pressure value in the second cleaning chamber is less than a minimum pressure value in the second cleaning chamber in a previous execution of step S22, and/or a duration of vacuumizing the second cleaning chamber is less than a duration of vacuumizing the second cleaning chamber in the previous execution of step S22.

4. The cleaning method for a semiconductor storage container according to claim 1, wherein the step S22 comprises:

maintaining a pressure value of the second cleaning chamber to be less than or equal to the first preset pressure value for a duration T_{S222}.

5. The cleaning method for a semiconductor storage container according to claim 1, wherein in the step S23, maintaining vacuumizing the second cleaning chamber.

6. The cleaning method for a semiconductor storage container according to claim 1, wherein the first preset pressure value is less than or equal to 100 Pa.

7. A cleaning system, characterized by comprising the cleaning method for a semiconductor storage container according to any one of claims 1 to 6.

8. A cleaning method for a semiconductor storage container, characterized in that the cleaning method is configured to remove residual AMC contaminants inside the semiconductor storage container, wherein the cleaning method comprises following steps:

S12, placing unlocked and separated semiconductor storage container components respectively in a first cleaning chamber;

S13, blowing a clean dry compressed gas onto a surface of the semiconductor storage container at a fifth average volumetric flow rate for a duration T_{S13};

S14, spraying cleaning liquid onto the surface of the semiconductor storage container to clean the surface of the semiconductor storage container; and

S15, blowing the clean dry compressed gas onto the surface of the semiconductor storage container.

9. The cleaning method for a semiconductor storage container according to claim 8, wherein in step S13 and/or step S15, a temperature of the clean dry compressed gas is greater than or equal to 40 °C and less than or equal to 80 °C.

10. The cleaning method for a semiconductor storage container according to claim 8, wherein step S15 further comprises steps of:

S151, blowing the clean dry compressed gas onto a surface of the semiconductor storage container for a duration T_{S151} to remove residual cleaning liquid in a pipeline; and

S152, blowing the clean dry compressed gas onto the surface of the semiconductor storage container for a duration T_{S152} to remove moisture on the surface of the semiconductor storage container and dry the semiconductor storage container,

wherein a flow rate of the clean dry compressed gas blown onto the surface of the semiconductor storage container in step S151 is greater than a flow rate of the clean dry compressed gas blown onto the surface of the semiconductor storage container in step S152; and the duration T_{S151} is less than the duration T_{S152}.

11. The cleaning method for a semiconductor storage container according to claim 8, wherein during a process of cleaning the semiconductor storage container in the first cleaning chamber, a contaminant residual level of gas discharged from the first cleaning chamber is detected, to determine whether to stop cleaning.

12. The cleaning method for a semiconductor storage container according to claim 8, wherein after step S15, the cleaning method further comprises a step of:

S16, after the semiconductor storage container is removed from the first cleaning chamber, cleaning the first cleaning chamber to reduce an internal contaminant residual level thereof.

13. A cleaning system, characterized by comprising the cleaning method for a semiconductor storage container according to any one of claims 8 to 12.

14. A cleaning method of a semiconductor storage container based on detection results, characterized by comprising following steps:

S31, placing unlocked and separated semiconductor storage container components respectively in a first cleaning chamber;

S32, cleaning the semiconductor storage container in the first cleaning chamber using cleaning liquid;

S33, detecting a contaminant level in the first cleaning chamber to obtain the detection results, wherein types of detected contaminants comprise particles and/or AMC; and

S34, performing subsequent processing according to the detection results,

wherein in step S33, the AMC comprises one or more of SO_2, inorganic ammonia, VOC, organic amines, and acids,

preferably, step S34 comprises:

setting a first preset threshold according to process parameters, wherein the first preset threshold is set comprehensively according to a cleaning processing capability of the first cleaning chamber, a container type, and process-required container index conditions; and

determining whether the detection results are below the first preset threshold, wherein when the detection results are below the first preset threshold, the semiconductor storage container completes a cleaning process in the present cleaning chamber;

otherwise, repeating steps S32 and S33,

further preferably, the step S33 comprises:

setting a second preset threshold according to process parameters, wherein the second preset threshold is greater than the first preset threshold, and the second preset threshold is set comprehensively according to the cleaning processing capability of the first cleaning chamber, the container type, and the process-required container index conditions, wherein

when the detection results are higher than the second preset threshold, a control unit connected to a detection device issues a warning signal;

preferably, after step S34, the cleaning method further comprises a step of:

S36, after the semiconductor storage container is removed from the first cleaning chamber, detecting a contaminant level in the first cleaning chamber, and determining whether an environment of the first cleaning chamber meets a requirement for cleaning the semiconductor storage container;

preferably, after step S34, the cleaning method further comprises a step of:

S35, after the first cleaning chamber completes cleaning of the semiconductor storage container and the semiconductor storage container is removed from the first cleaning chamber, cleaning the first cleaning chamber.

15. A cleaning system, characterized by comprising the cleaning method of a semiconductor storage container based on detection results according to claim 14.