

ELECTRONIC COMPONENT TESTING EQUIPMENT CAPABLE OF BUFFERING TEMPERATURE OF DEVICE UNDER TEST

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to electronic component testing equipment and more particularly, to an electronic component testing equipment capable of buffering the temperature of the device under test.

2. Description of the Related Art

Referring to FIG. 1, a conventional electronic component testing equipment 10 includes a testing chamber 11, a chuck 12 and a testing device 13 (e.g., probe card) disposed in the testing chamber 11, a gate 14 for opening and closing an access (not shown) of the testing chamber 11, and a manipulator 15, also known as robot arm, disposed outside the testing chamber 11. The manipulator 15 is composed of a plurality of arms 17, thereby capable of multi-dimensional movement and rotation. The terminal arm 17 of the manipulator 15 is provided with a pick and place member 18, such as a clamp or fork-shaped bracket, for taking a device under test 16 (e.g., wafer) from a device under test storage device (not shown; e.g., wafer cassette) located outside the testing chamber 11 and placing the device under test 16 onto the chuck 12 located in the testing chamber 11. Then, the chuck 12 may cool down the device under test 16 to attain a low temperature required for testing. Then, the testing device 13 performs electrical testing to electrically contact the device under test 16 by one or a plurality of probes (not shown). At last, the manipulator 15 takes the device under test 16 that has been completely tested out of the testing chamber 11.

As described above, the device under test 16 is usually cooled down by the chuck 12 to a specific low temperature for the testing, so the testing chamber 11 usually communicates with a dry air source 194 through a pipe 192, so that the testing chamber 11 continues

receiving dry air to maintain a dew point temperature below the test temperature, thereby preventing the device under test 16 from frost or dew. However, if the device under test 16, which has been completely tested and still in the low temperature status, is directly taken by the manipulator 15 from the testing chamber 11 to the external environment, the temperature of the device under test 16 at this time will be lower than the dew point temperature of the external environment outside the testing chamber 11, so frost or dew will be formed on the surface of the device under test 16 to damage the electrical characteristics of the device under test 16.

For avoiding the aforementioned problem, in the prior art, the device under test 16, which has been completely tested, will be heated to a specific temperature in the testing chamber 11 by the chuck 12 before being taken out by the manipulator 15. Although such solution can prevent the device under test 16 that has been completely tested from frost or dew in the external environment outside the testing chamber 11, the aforementioned heating process consumes much time. Besides, after the next device under test 16 is disposed on the chuck 12, it also consumes much time for the chuck 12 to cool down itself for cooling down the device under test 16 to the low temperature required for the testing. That is to say such solution will increase the time required for the testing, resulting in low testing efficiency, so it still needs improvement.

SUMMARY OF THE INVENTION

The present invention has been accomplished in view of the above-noted circumstances. It is an objective of the present invention to provide an electronic component testing equipment which can buffer the temperature of the device under test to prevent the device under test from frost or dew, and maintain high testing efficiency.

To attain the above objective, the present invention provides an electronic component testing equipment capable of buffering the temperature of the device under test, which comprises a testing unit, a buffering unit and a dry air supplying device. The testing unit

includes a testing chamber, and a chuck disposed in the testing chamber. The buffering unit includes a buffering chamber, and a pick and place member, a horizontal displacement device, a buffering device and a vertical displacement device, which are disposed in the buffering chamber. The buffering chamber has a first access selectively communicating with an external environment, and a second access selectively or directly communicating with the testing chamber. That means a device such as a gate is provided to control the open and close of the first access, and another device such as another gate may be provided to control the open and close of the second access or the second access may be not provided with such device, thereby kept communicating with the testing chamber. The pick and place member is disposed on the horizontal displacement device and drivenable by the horizontal displacement device to move into the testing chamber through the second access along a first horizontal axis. The buffering device includes a first tray and a second tray each for carrying a device under test. The buffering device is disposed on the vertical displacement device and drivenable by the vertical displacement device to move between a first position and a second position along a vertical axis. When the buffering device is located at the first position, the first tray corresponds in position to the chuck along the first horizontal axis for the pick and place member to transfer the device under test disposed on the first tray to the chuck along the first horizontal axis. When the buffering device is located at the second position, the second tray corresponds in position to the chuck along the first horizontal axis for the pick and place member to transfer the device under test disposed on the chuck to the second tray along the first horizontal axis. The dry air supplying device communicates with the testing chamber and the buffering chamber for supplying dry air into the testing chamber and the buffering chamber.

As a result, the dry air supplying device can maintain the dew point temperature in the testing chamber and the dew point temperature in the buffering chamber at relatively lower temperature, so that the device under test is prevented from frost or dew when located in the testing chamber and the buffering chamber. When the first access of the buffering chamber is

in an open state and thereby communicates with the external environment, a device under test located in the external environment and going to be tested can be transferred to the first tray, and then transferred to the chuck by the pick and place member when the buffering device is located at the first position, so as to be tested by a testing device disposed in the testing chamber under a low temperature condition. The device under test that undergoes complete testing can be transferred to the second tray by the pick and place member when the buffering device is located at the second position. The tested device under test may be heated by the second tray, or not heated to allow the temperature of the tested device under test to raise naturally. When the temperature of the tested device under test is higher than the dew point temperature of the external environment, the tested device under test can be transferred to the external environment and prevented from frost or dew. In the above-described process, the first access will be opened only in a short period when the device under test is transferred from the external environment into the buffering chamber and another short period when the tested device under test is transferred from the buffering chamber to the external environment, but in the other periods the first access of the buffering chamber can be closed without communicating with the external environment to prevent the buffering chamber from being affected by the temperature and humidity of the external environment. In the process that the device under test is tested in the testing chamber, the previous tested device under test can stay on the second tray located in the buffering chamber to allow the temperature thereof to raise and then be transferred to the external environment, and in this process, the next-to-be-tested device under test can be transferred to the first tray located in the buffering chamber and optionally pre-cooled by the first tray. Therefore, after the device under test located in the testing chamber has been completely tested, it can be transferred to the second tray right away, and then the next-to-be-tested device under test can be transferred to the chuck right away. At this time, the chuck is still in the low temperature condition required for the testing, and the device under test disposed on the chuck may have been pre-cooled, so the device under test

located on the chuck can quickly attain the low temperature required for the testing, thereby being tested quickly. As a result, the electronic component testing equipment of the present invention can avoid that the time required for the whole testing course is increased for buffering the temperature of the device under test, so it can maintain high testing efficiency.

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view of a conventional electronic component testing equipment.

FIG. 2 is a schematic view of an electronic component testing equipment capable of buffering the temperature of a device under test according to a first preferred embodiment of the present invention.

FIG. 3 is similar to FIG. 2, but a buffering device of the electronic component testing equipment is located at a first position and a second position in FIG. 2 and FIG. 3, respectively.

FIG. 4 is an assembled perspective view of a buffering unit, a gate and a device under test storage seat of the electronic component testing equipment.

FIG. 5 is a partial left view of the buffering unit in FIG. 4, and further shows another gate.

FIG. 6 is a front view of the buffering unit in FIG. 4.

FIG. 7 and FIG. 8 are assembled perspective views of an inner structure of the buffering unit in different view angles.

FIG. 9 is a schematic view of an electronic component testing equipment capable of buffering the temperature of a device under test according to a second preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

First of all, it is to be mentioned that same or similar reference numerals used in the following embodiments and the appendix drawings designate same or similar elements or the structural features thereof throughout the specification for the purpose of concise illustration of the present invention. It should be noticed that for the convenience of illustration, the components and the structure shown in the figures are not drawn according to the real scale and amount, and the features mentioned in each embodiment can be applied in the other embodiments if the application is possible in practice. Besides, when it is mentioned that an element is disposed on another element, it means that the former element is directly disposed on the latter element, or the former element is indirectly disposed on the latter element through one or more other elements between aforesaid former and latter elements. When it is mentioned that an element is directly disposed on another element, it means that no other element is disposed between aforesaid former and latter elements.

Referring to FIG. 2 and FIG. 3, an electronic component testing equipment 20 capable of buffering the temperature of a device under test according to a first preferred embodiment of the present invention includes a testing unit 30, a buffering unit 40, first and second gates 51 and 52, a pick and place device 64, and a dry air supplying device 70.

The testing unit 30 primarily includes a testing chamber 31, and a chuck 32 and a testing device 33, which are disposed in the testing chamber 31. The chuck 32 is adapted for supporting a device under test 80, and the chuck 32 is provided therein with a cooling mechanism (not shown), such as cooling chip, air cooler, hydrocooler or oil cooler, for cooling down the device under test 80 disposed on the chuck 32. The testing device 33 may be, but not limited to, a probe card having a plurality of probes (not shown) or an edge sensor having only

one probe, for electrically testing electric contacts (not shown) of the device under test 80 by the probe when the temperature of the device under test 80 attains a low temperature required for the testing. The device under test 80 mentioned in the present invention may, but not limited to, be a substrate provided with a plurality of tiny electronic components, such as a wafer or a flexible film with a wafer sliced into a plurality of chips going to be tested.

The buffering unit 40 primarily includes a buffering chamber 41, and a pick and place member 42, a horizontal displacement device 43, a buffering device 44 and a vertical displacement device 45 as shown in FIG. 8, which are disposed in the buffering chamber 41. It should be firstly mentioned that only primary members of the present invention are schematically drawn in FIG. 2 and FIG. 3 for the convenience of illustrating the acting process and effect of the present invention, but the practical members may not exactly the same in shape, configuration, size, scale and relative position with those shown in FIG. 2 and FIG. 3. Besides, one of the technical features of the present invention primarily lies in the buffering unit 40, and the detailed configuration thereof is shown in FIG. 4 to FIG. 8.

As shown in FIG. 4, the buffering chamber 41 is a hollow housing approximately shaped in appearance as a cuboid, and so is the aforementioned testing chamber 31. The buffering chamber 41 is fixed to a top surface 622 of a device under test storage seat 62. The device under test storage seat 62 may be, but not limited to, a conventional device for storing devices under test 80, such as a wafer cassette, so the structure thereof will not be specified hereinafter. The buffering chamber 41 is disposed on the top surface 622 of the device under test storage seat 62 for the convenience of the transferring of the device under test 80 from the device under test storage seat 62 to the buffering chamber 41, which will be specified hereinafter.

Referring to FIG. 4, FIG. 5 and FIG. 6, the buffering chamber 41 is provided on two vertical surfaces 411 and 412 thereof with a first access 413 as shown in FIG. 5 and a second access 414 as shown in FIG. 6, respectively. The first gate 51 is disposed on the vertical

surface 411 for opening and closing the first access 413 by the upward and downward movement of a baffle 512. The second gate 52 is disposed on the vertical surface 412 for opening and closing the second access 414 by the upward and downward movement of a baffle 522. Specifically speaking, the whole structure of the second gate 52 is similar to a tunnel with rectangular cross sections. An end of the second gate 52 is fixedly connected to the vertical surface 412 through an organ type telescopic tube to cover the second access 414. The other end of the second gate 52 is provided with a fixed base plate 521 fixedly connected to a vertical surface of the testing chamber 31. The fixed base plate 521 has an elongated opening 521a communicating with the second access 414. The baffle 522 is moved upward and downward to block or not block the elongated opening 521a, causing the elongated opening 521a to communicate or not communicate with the second access 414, thereby providing a passage for the device under test 80 to pass therethrough or closing this passage. The baffle 512 and the baffle 522 may even airtightly cover the first access 413 and the second access 414, respectively. The term ‘airtightly cover’ mentioned in the present invention refers to that the baffle covering the access maintains the flow rate of the dry air entering the chamber higher than the leakage, instead of a completely airproof status. The aforementioned baffles 512 and 522 of the first and second gates 51 and 52 may be driven by a driver such as a pneumatic cylinder or hydraulic cylinder as shown in FIG. 5 in association with rails. In FIG. 2 and FIG. 3, the aforementioned first and second accesses 413 and 414 are schematically indicated on the right side and the left side of the buffering chamber 41. As shown in the figures, the first gate 51 makes the first access 413 selectively communicate with an external environment 22, and the second gate 52 makes the second access 414 selectively communicate with the testing chamber 31.

Referring to FIG. 7 and FIG. 8, the buffering unit 40 in this embodiment includes a base 46 fixedly disposed in the buffering chamber 41. The vertical displacement device 45 is disposed on a vertical surface 461 of the base 46. The vertical displacement device 45 is

similar to the conventional linear displacement assembly including a motor, a slide rail and a slider for providing linear displacement, so the structure thereof needs not be specified hereinafter. The horizontal displacement device 43 is disposed on the top 462 of the base 46 and extends from the top 462 in the direction that the vertical surface 461 faces toward, i.e., the negative direction of Y-axis. Specifically speaking, the horizontal displacement device 43 includes first and second linear displacement assemblies 431 and 432, an extending arm 434, and a third linear displacement assembly 433. The first to third linear displacement assemblies 431-433 are also similar to the conventional linear displacement assembly including a motor, a slide rail and a slider for providing linear displacement, so the structure thereof needs not be specified hereinafter. The slide rail 431a of the first linear displacement assembly 431 is fixed to the top 462 of the base 46, and the slide rail 432a of the second linear displacement assembly 432 is fixed to the slider 431b of the first linear displacement assembly 431, so that the second linear displacement assembly 432 can be driven by the first linear displacement assembly 431 to move along a first horizontal axis (X-axis). The extending arm 434 is fixed to the slider of the second linear displacement assembly 432, so that the extending arm 434 can be driven by the second linear displacement assembly 432 to move along the first horizontal axis (X-axis). The third linear displacement assembly 433 is disposed at the terminal part of the extending arm 434. The pick and place member 42 is fixed to the slider of the third linear displacement assembly 433, so that the pick and place member 42 can be driven by the third linear displacement assembly 433 to move along the first horizontal axis (X-axis). In other words, the pick and place member 42 in this embodiment is driven by three linear displacement assemblies 431-433 to move along the first horizontal axis (X-axis). Such structural design uses a plurality of relatively shorter linear displacement assemblies to enable the pick and place member 42 to move for a relatively longer distance, so that the pick and place member 42 can move into the testing chamber 31 through the second access 414. However, the amount of the linear displacement assembly of the horizontal displacement

device 43 is unlimited, but can be increased or decreased according to requirements.

The buffering device 44 includes a frame 443 fixed to the slider of the aforementioned vertical displacement device 45, and a first tray 441 and a second tray 442, which are fixed to the frame 443. The first and second trays 441 and 442 are distanced from each other along a vertical axis (Z-axis) and disposed horizontally and parallel to each other, such that each of the first and second trays 441 and 442 can carry one said device under test 80. In this embodiment, the first tray 441 includes two first plates 441a fixed to the frame 443 and separated from each other along a second horizontal axis (Y-axis), and a passage 441b formed between the two first plates 441a and extending along the first horizontal axis (X-axis), such that the pick and place member 42 can pass through the passage 441b when moving along the first horizontal axis (X-axis). The second tray 442 includes two second plates 442a fixed to the frame 443 and separated from each other along the second horizontal axis (Y-axis), and a passage 442b formed between the two second plates 442a and extending along the first horizontal axis (X-axis), such that the pick and place member 42 can pass through the passage 442b when moving along the first horizontal axis (X-axis).

Referring to FIG. 2 and FIG. 3, the pick and place device 64 may be a conventional manipulator, which is also known as robot arm, so the structure thereof needs not be specified hereinafter. The pick and place device 64 is disposed in the external environment 22 and corresponds in position to the first access 413 of the buffering chamber 41. When the first access 413 is in an open state, the pick and place device 64 can take out a device under test 80 going to be tested from the aforementioned device under test storage seat 62 and place the device under test 80 onto the first tray 441 through the first access 413, and the pick and place device 64 can also take out the tested device under test 80 located on the second tray 442 to the external environment 22 through the first access 413, which will be specified in the following.

The buffering device 44 can be driven by the vertical displacement device 45 to

move between a first position P1 as shown in FIG. 2 and a second position P2 as shown in FIG. 3 along a vertical axis (Z-axis). When the buffering device 44 is located at the first position P1 as shown in FIG. 2, the first tray 441 corresponds in elevation to the chuck 32 along the first horizontal axis (X-axis). The pick and place member 42 also corresponds in elevation to the chuck 32 along the first horizontal axis (X-axis) and at this time further corresponds in position to the passage 441b of the first tray 441 along the first horizontal axis (X-axis). That means at this time the pick and place member 42, the first tray 441 and the chuck 32 are approximately aligned with each other along the first horizontal axis (X-axis). At this time, the pick and place member 42 can clamp the device under test 80 disposed on the first tray 441 and going to be tested, and move in the positive direction of X-axis, so as to transfer the device under test 80 to the chuck 32. When the buffering device 44 is located at the second position P2 as shown in FIG. 3, the second tray 442 corresponds in elevation to the chuck 32 along the first horizontal axis (X-axis). At this time, the pick and place member 42 also corresponds in elevation to the passage 442b of the second tray 442 along the first horizontal axis (X-axis). That means at this time the pick and place member 42, the second tray 442 and the chuck 32 are approximately aligned with each other along the first horizontal axis (X-axis). At this time, the pick and place member 42 can clamp the device under test 80 disposed on the chuck 32 and finished with the testing, and move in the negative direction of X-axis, so as to transfer the tested device under test 80 to the second tray 442. Then, as long as the first access 413 is opened, the pick and place device 64 can take out the tested device under test 80 located on the second tray 442 to the external environment 22. It should be noticed that in the present invention, when it is mentioned that the first (or second) tray corresponds in position or in elevation to the chuck along the first horizontal axis (X-axis), it refers to that an imaginary straight line extending along X-axis from the first (or second) tray can reach to the chuck so that the pick and place member can transfer the device under test between the first (or second) tray and the chuck by only moving along X-axis. That means the first (or second) tray and the

chuck are equal or similar in Y-axis position and Z-axis position.

The dry air supplying device 70 includes a dry air source 71, and two pipes 72 and 73 respectively communicating the testing chamber 31 and the buffering chamber 41 with the dry air source 71 for supplying dry air into the testing chamber 31 and the buffering chamber 41. In this way, the dry air supplying device 70 provides dry air flows F1 and F2 into the testing chamber 31 and the buffering chamber 41 respectively, capable of controlling the dew point temperature in the testing chamber 31 and the dew point temperature in the buffering chamber 41 at relatively lower temperature to prevent the device under test 80 from frost or dew when located in the testing chamber 31 and the buffering chamber 41. Specifically speaking, the device under test 80 located on the chuck 32 is tested by the testing device 33 under low temperature condition, and the tested device under test 80, i.e., the device under test 80 has undergone the testing task completely, is transferred to the second tray 442 located in the buffering chamber 41. Therefore, as long as the dew point temperature in the testing chamber 31 and the dew point temperature in the buffering chamber 41 are lower than the temperature of the device under test 80 undergoing the testing by the testing device 33, the device under test 80 can be prevented from frost or dew. The tested device under test 80 may be heated by the second tray 442, which means the second tray 442 is optionally provided with a heating mechanism, or the tested device under test 80 may be not heated to allow the temperature thereof to raise naturally. When the temperature of the tested device under test 80 is higher than the dew point temperature in the external environment 22, the tested device under test 80 can be transferred to the external environment 22 and prevented from frost or dew. In this embodiment, when it is mentioned that the dew point temperature is at the relatively lower temperature, it refers to a relative temperature, not an absolute temperature, which means the dew point temperature in the testing chamber 31 and the dew point temperature in the buffering chamber 41 are set to be lower than the temperature of the device under test 80 undergoing the testing by the testing device 33.

In the entire aforementioned testing course, the first access 413 will be opened only in the short periods of the pick and place device 64 transferring the device under test 80 between the external environment 22 and the buffering chamber 41, but in all the other periods the first access 413 can be closed to prevent the buffering chamber 41 from being affected by the external environment 22. Likewise, the second access 414 will be opened in the short periods of the pick and place member 42 transferring the device under test 80 between the buffering chamber 41 and the testing chamber 31, but in all the other periods the second access 414 can be closed to prevent the testing chamber 31 from being affected by the buffering chamber 41. Besides, the pipe 72 communicating with the dry air source 71 is arranged on or above the top side of the testing chamber 31 and adjacent to the second access 414. The pipe 72 communicating with the dry air source 71 is connected to the testing chamber 31 at an air outlet arranged on the top side of the testing chamber 31 and adjacent to the second access 414. The pipe 72 communicating with the dry air source 71 is arranged on or above the top side of the testing chamber 31 and adjacent to the buffering chamber 41. The pipe 72 communicating with the dry air source 71 is connected to the testing chamber 31 at the air outlet arranged on the top side of the testing chamber 31 and adjacent to the buffering chamber 41. The dry air flow F1 in the testing chamber 31 is arranged adjacent to the second access 414. The dry air flow F1 in the testing chamber 31 can block the inner environment of the buffering chamber 41 from affecting the dew point temperature in the testing chamber 31 when the second access 414 is opened. The pipe 73 communicating with the dry air source 71 is arranged on or above the top side of the buffering chamber 41 and adjacent to the first access 413. The pipe 73 communicating with the dry air source 71 is connected to the buffering chamber 41 at an air outlet arranged on the top side of the buffering chamber 41 and adjacent to the first access 413. The pipe 73 communicating with the dry air source 71 is arranged on or above the top side of the buffering chamber 41 and away from the testing chamber 31. The pipe 73 communicating with the dry air source 71 is connected to the buffering chamber 41 at the air outlet arranged

on the top side of the buffering chamber 41 and away from the testing chamber 31. The dry air flow F2 in the buffering chamber 41 is arranged adjacent to the first access 413. The dry air flow F2 in the buffering chamber 41 can block the external environment 22 from affecting the dew point temperature in the buffering chamber 41 when the first access 413 is opened. Besides, as shown in FIG. 5, in the present invention the height H1 of the first access 413 of the buffering chamber 41 along the vertical axis (Z-axis) is preferably designed to be smaller than or equal to a half of the height H2 of the buffering chamber 41 along the vertical axis (Z-axis), i.e., $H1 \leq \frac{1}{2}H2$, or more preferably $H1 \leq \frac{1}{3}H2$. This is for making the first access 413 a small slot only for the pick and place device 64 to horizontally transfer the device under test 80, so as to further prevent the buffering chamber 41 from being affected by the external environment 22 when the first access 413 is opened or prevent the dry air in the buffering chamber 41 from massive leakage to the external environment 22. Likewise, in the present invention the second access 414 of the buffering chamber 41, or specifically speaking a passage formed by the combination of the elongated opening 521a of the fixed base plate 521 of the second gate 52 and the second access 414, i.e., the passage communicating the testing unit 30 with the buffering unit 40 for the device under test 80 to pass therethrough, is also preferably designed with the height along the vertical axis (Z-axis) smaller than or equal to a half of or more preferably one third of the height H2 of the buffering chamber 41 along the vertical axis (Z-axis). In this way, the second access 414 or the aforementioned passage can be formed as a small slot only for the pick and place member 42 to horizontally transfer the device under test 80, so as to prevent the inner testing environment of the testing chamber 31 from being affected by the inner environment of the buffering chamber 41 when the second access 414 is opened. In a preferred embodiment of the present invention, the aforementioned dry air flow F2 provided by the pipe 73 communicating with the dry air source 71 and arranged adjacent to the first access 413 causes the pressure of the inner environment of the buffering chamber 41 adjacent to the first access 413 larger than the pressure of the external

environment 22. When the first access 413 is opened, an air flow is formed to stream from the buffering chamber 41 toward the external environment 22, i.e., an air flow streaming from the inside to the outside of the buffering chamber 41, preventing the air in the external environment 22 from flowing into the buffering chamber 41. The opening of the first access 413 may be minimized in dimension as small as possible, i.e., the minimum size only for the pick and place device 64 to pass through for horizontally transferring the device under test 80, thereby increasing the strength of the air flow streaming from the inside to the outside of the buffering chamber 41.

It takes quite a long time for the device under test 80 to undergo the complete testing task by the testing device 33. Therefore, in this testing process, the temperature of the previous tested device under test 80 on the second tray 442 will raise to a desired and then the tested device under test 80 can be transferred to the external environment 22, and the next device under test 80 going to be tested can be transferred to the first tray 441 in this process. The aforementioned two transferring steps are unlimited in order, and can be both completed in the aforementioned testing process. Therefore, the present invention can save the time for transferring the devices under test 80, thereby enhancing the efficiency of the entire testing course. The first tray 441 may preferably be provided with a pre-cooling mechanism for pre-cooling the device under test 80 going to be tested. As a result, after the testing task of the device under test 80 located in the testing chamber 31 is finished, the tested device under test 80 can be transferred to the second tray 442 right away, and then the next device under test 80 going to be tested can be transferred from the first tray 441 to the chuck 32 right away. At this time, the chuck 32 is still under the low temperature required for the testing and the device under test 80 disposed on the chuck 32 may have been pre-cooled, so the device under test 80 located on the chuck 32 can attain the low temperature required for the testing quickly so as to be tested quickly. As a result, the electronic component testing equipment 20 of the present invention can avoid the increase of time required for the entire testing course resulted from the

requirement of buffering the temperature of the device under test 80, thereby maintain high testing efficiency.

Referring to FIG. 9, a second preferred embodiment of the present invention is similar to the first preferred embodiment, but in FIG. 9 there is no such second gate 52 disposed between the testing chamber 31 and the buffering chamber 41. In other words, the second access 414 of the buffering chamber 41 cannot be selectively communicated with the testing chamber 31. That means the second access 414 of the buffering chamber 41 can't be closed, but keeps communicating with the testing chamber 31 directly. As described above, the dew point temperature in the testing chamber 31 and the dew point temperature in the buffering chamber 41 are both lower than the temperature of the device under test 80 undergoing the testing by the testing device 33, so the cross-influence between the testing chamber 31 and the buffering chamber 41 can be minimized. Besides, the dry air flow F1 in the testing chamber 31 can block the inner environment of the buffering chamber 41 from affecting the dew point temperature in the testing chamber 31, so this embodiment can also attain the aforementioned effects of the first preferred embodiment.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the structural features and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

WHAT IS CLAIMED IS:

1. An electronic component testing equipment defined with a first horizontal axis, a second horizontal axis and a vertical axis, which are perpendicular to each other, the electronic component testing equipment comprising:

a testing unit comprising a testing chamber and a chuck disposed in the testing chamber for supporting a device under test;

a buffering unit comprising a buffering chamber, and a pick and place member, a horizontal displacement device, a buffering device and a vertical displacement device, which are disposed in the buffering chamber, the buffering chamber having a first access selectively communicating with an external environment, and a second access selectively or directly communicating with the testing chamber, the pick and place member being disposed on the horizontal displacement device and drivenable by the horizontal displacement device to move into the testing chamber through the second access along the first horizontal axis, the buffering device comprising a first tray and a second tray each for carrying one said device under test, the buffering device being disposed on the vertical displacement device and drivenable by the vertical displacement device to move between a first position and a second position along the vertical axis, when the buffering device is located at the first position, the first tray corresponding in position to the chuck along the first horizontal axis for enabling the pick and place member to transfer the device under test disposed on the first tray to the chuck along the first horizontal axis, when the buffering device is located at the second position, the second tray corresponding in position to the chuck along the first horizontal axis for enabling the pick and place member to transfer the device under test disposed on the chuck to the second tray along the first horizontal axis; and

a dry air supplying device communicating with the testing chamber and the buffering chamber for supplying dry air into the testing chamber and the buffering chamber.

2. The electronic component testing equipment as claimed in claim 1, wherein a height of the first access of the buffering chamber along the vertical axis is smaller than or equal to one third of a height of the buffering chamber along the vertical axis.

3. The electronic component testing equipment as claimed in claim 1, further comprising a device under test storage seat; the buffering chamber is disposed on a top surface of the device under test storage seat.

4. The electronic component testing equipment as claimed in claim 1, wherein the first tray is provided with a pre-cooling mechanism; the second tray is provided with a heating mechanism.

5. The electronic component testing equipment as claimed in claim 1, further comprising a pick and place device disposed in the external environment for passing through the first access to place the device under test on the first tray and take out the device under test located on the second tray to the external environment.

6. The electronic component testing equipment as claimed in claim 1, wherein the buffering device comprises a frame disposed on the vertical displacement device; the first tray comprises two first plates fixed to the frame and separated from each other along the second horizontal axis, and a passage formed between the two first plates and extending along the first horizontal axis; the second tray comprises two second plates fixed to the frame and separated from each other along the second horizontal axis, and a passage formed between the two second plates and extending along the first horizontal axis; when the buffering device is located at the first position, the pick and place member corresponds in position to the passage of the first tray along the first horizontal axis; when the buffering device is located at the

second position, the pick and place member corresponds in position to the passage of the second tray along the first horizontal axis.

7. The electronic component testing equipment as claimed in claim 6, wherein the buffering unit comprises a base disposed in the buffering chamber; the vertical displacement device is disposed on a vertical surface of the base; the horizontal displacement device is disposed on a top of the base and extends from the top in a direction that the vertical surface faces toward.

8. The electronic component testing equipment as claimed in claim 7, wherein the horizontal displacement device comprises at least one linear displacement assembly disposed on the top of the base, and an extending arm disposed on said at least one linear displacement assembly and drivable by said at least one linear displacement assembly to move along the first horizontal axis; the pick and place member is disposed on the extending arm.

9. The electronic component testing equipment as claimed in claim 8, wherein said at least one linear displacement assembly comprises a first linear displacement assembly disposed on the top of the base, and a second linear displacement assembly disposed on the first linear displacement assembly and drivable by the first linear displacement assembly to move along the first horizontal axis; the extending arm is disposed on the second linear displacement assembly and drivable by the second linear displacement assembly to move along the first horizontal axis.

10. The electronic component testing equipment as claimed in claim 8, wherein the horizontal displacement device further comprises another linear displacement assembly disposed on the extending arm; the pick and place member is disposed on said another linear

displacement assembly and drivenable by said another linear displacement assembly to move along the first horizontal axis.

11. The electronic component testing equipment as claimed in claim 1, wherein the electronic component testing equipment further comprises a baffle movably disposed on the buffering chamber to open or close the first access.

12. The electronic component testing equipment as claimed in claim 1, wherein the electronic component testing equipment further comprises a baffle movably disposed on the buffering chamber to open or close the second access.

13. The electronic component testing equipment as claimed in claim 12, wherein a height of the second access of the buffering chamber along the vertical axis is smaller than or equal to one third of a height of the buffering chamber along the vertical axis.

14. The electronic component testing equipment as claimed in claim 1, wherein a dry air flow is supplied by the dry air supplying device into the buffering chamber and arranged adjacent to the first access.

15. The electronic component testing equipment as claimed in claim 14, wherein another dry air flow is supplied by the dry air supplying device into the testing chamber and arranged adjacent to the second access.

16. The electronic component testing equipment as claimed in claim 1, wherein a dry air flow is supplied by the dry air supplying device into the testing chamber and arranged adjacent to the second access.