CLAIMS

[Claim 1] A polishing apparatus, comprising:

a polishing table supporting a polishing pad;

a polishing head having a plurality of concentrically divided pressure chambers, for pressing a substrate against the polishing surface of the polishing pad;

a plurality of pressure regulators coupled to the pressure chambers;

a film thickness sensor embedded in the polishing table, the film thickness sensor being configured to output a signal corresponding to a film thickness of the substrate; and

an operation controller configured to control a pressure of each of the pressure chambers individually through the pressure regulators,

wherein the operation controller is configured to:

obtain information related to a specific position, which is a part of a circumference of the substrate, and calculate a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate; and

control the pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the control target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the operation controller is configured to identify the specific position based on a film thickness of the substrate measured before polishing.

[Claim 2] A polishing apparatus, comprising:

a polishing table supporting a polishing pad;

a polishing head having a plurality of concentrically divided pressure chambers, for pressing a substrate against the polishing surface of the polishing pad;

a plurality of pressure regulators coupled to the pressure chambers;

a film thickness sensor embedded in the polishing table, the film thickness sensor

being configured to output a signal corresponding to a film thickness of the substrate; and

an operation controller configured to control a pressure of each of the pressure chambers individually through the pressure regulators,

wherein the operation controller is configured to:

obtain information related to a specific position, which is a part of a circumference of the substrate, and calculate a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate; and

control the pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the control target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the operation controller is configured to:

determine a maximum film thickness position at which a maximum film thickness value is obtained and a minimum film thickness position at which a minimum film thickness value is obtained, based on a film thickness of the substrate measured before polishing; and

determine at least one of the maximum film thickness position and the minimum film thickness position as the specific position.

[Claim 3] A polishing apparatus, comprising:

a polishing table supporting a polishing pad;

a polishing head having a plurality of concentrically divided pressure chambers, for pressing a substrate against the polishing surface of the polishing pad;

a plurality of pressure regulators coupled to the pressure chambers;

a film thickness sensor embedded in the polishing table, the film thickness sensor being configured to output a signal corresponding to a film thickness of the substrate; and

an operation controller configured to control a pressure of each of the pressure chambers individually through the pressure regulators,

wherein the operation controller is configured to:

obtain information related to a specific position, which is a part of a circumference of the substrate, and calculate a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate; and

control the pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the control target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the operation controller is configured to:

determine a maximum film thickness value and a minimum film thickness value based on the film thickness of the substrate measured before polishing;

calculate a difference between the average film thickness value of the entire substrate and the maximum film thickness value, and a difference between the average film thickness value of the entire substrate and the minimum film thickness value; and

determine a position on the substrate where the film thickness value with a largest difference is obtained as the specific position.

[Claim 4] A polishing apparatus, comprising:

a polishing table supporting a polishing pad;

a polishing head having a plurality of concentrically divided pressure chambers, for pressing a substrate against the polishing surface of the polishing pad;

a plurality of pressure regulators coupled to the pressure chambers;

a film thickness sensor embedded in the polishing table, the film thickness sensor being configured to output a signal corresponding to a film thickness of the substrate; and

an operation controller configured to control a pressure of each of the pressure chambers individually through the pressure regulators,

wherein the operation controller is configured to:

obtain information related to a specific position, which is a part of a circumference of the substrate, and calculate a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate; and

control the pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the control target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the control target film thickness value corresponds to at least one of the maximum film thickness value and the minimum film thickness value determined based on the film thickness of the substrate measured before polishing.

[Claim 5] A polishing apparatus, comprising:

a polishing table supporting a polishing pad;

a polishing head having a plurality of concentrically divided pressure chambers, for pressing a substrate against the polishing surface of the polishing pad;

a plurality of pressure regulators coupled to the pressure chambers;

a film thickness sensor embedded in the polishing table, the film thickness sensor being configured to output a signal corresponding to a film thickness of the substrate; and

an operation controller configured to control a pressure of each of the pressure chambers individually through the pressure regulators,

wherein the operation controller is configured to:

obtain information related to a specific position, which is a part of a circumference of the substrate, and calculate a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate; and

control the pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the control target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the control target film thickness value is an average value of the film thickness values within the control target area.

[Claim 6] A polishing apparatus, comprising:

a polishing table supporting a polishing pad;

a polishing head having a plurality of concentrically divided pressure chambers, for pressing a substrate against the polishing surface of the polishing pad;

a plurality of pressure regulators coupled to the pressure chambers;

a film thickness sensor embedded in the polishing table, the film thickness sensor being configured to output a signal corresponding to a film thickness of the substrate; and

an operation controller configured to control a pressure of each of the pressure chambers individually through the pressure regulators,

wherein the operation controller is configured to:

obtain information related to a specific position, which is a part of a circumference of the substrate, and calculate a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate; and

control the pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the control target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the operation controller is configured to:

measure a film thickness of the control target area including the specific position during polishing based on the signal output from the film thickness sensor; and

control the pressure in the pressure chamber of the polishing head corresponding to the specific position based on the measured film thickness.

[Claim 7] A polishing apparatus, comprising:

a polishing table supporting a polishing pad;

a polishing head having a plurality of concentrically divided pressure chambers, for pressing a substrate against the polishing surface of the polishing pad;

a plurality of pressure regulators coupled to the pressure chambers;

a film thickness sensor embedded in the polishing table, the film thickness sensor being configured to output a signal corresponding to a film thickness of the substrate; and

an operation controller configured to control a pressure of each of the pressure chambers individually through the pressure regulators,

wherein the operation controller is configured to:

obtain information related to a specific position, which is a part of a circumference of the substrate, and calculate a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate; and

control the pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the control target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the operation controller is configured to:

divide a plurality of pressing areas on the substrate divided corresponding to the pressure chambers into a specific pressing area including the control target area and an other pressing area excluding the specific pressure area;

calculate an average film thickness value in the other pressing area based on the film thickness of the substrate; and

control the pressure in the pressure chamber corresponding to the other pressing area so that a difference between the average film thickness value in the other pressing area and the average film thickness value of the entire substrate is reduced.

[Claim 8] A polishing apparatus, comprising:

a polishing table supporting a polishing pad;

a polishing head having a plurality of concentrically divided pressure chambers,

for pressing a substrate against the polishing surface of the polishing pad;

a plurality of pressure regulators coupled to the pressure chambers;

a film thickness sensor embedded in the polishing table, the film thickness sensor being configured to output a signal corresponding to a film thickness of the substrate; and

an operation controller configured to control a pressure of each of the pressure chambers individually through the pressure regulators,

wherein the operation controller is configured to:

obtain information related to a specific position, which is a part of a circumference of the substrate, and calculate a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate; and

control the pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the control target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the operation controller is configured to:

obtain information related to a reference position, which is a part of the circumference of a reference substrate that is different from the substrate;

detect physical quantities corresponding to the film thickness of an area on the substrate including the reference position by the film thickness sensor during polishing of the reference substrate;

obtain a plurality of data corresponding to the film thickness of the reference substrate based on a plurality of signals sent from the film thickness sensor; and

associate each of data with the film thickness of the reference substrate when obtaining each of data.

[Claim 9] The polishing apparatus according to claim 8, wherein the operation controller is configured to determine the reference position based on the film thickness of the reference substrate measured before polishing.

[Claim 10] A polishing apparatus, comprising:

a polishing table supporting a polishing pad;

a polishing head having a plurality of concentrically divided pressure chambers, for pressing a substrate against the polishing surface of the polishing pad;

a plurality of pressure regulators coupled to the pressure chambers;

a film thickness sensor embedded in the polishing table, the film thickness sensor being configured to output a signal corresponding to a film thickness of the substrate; and

an operation controller configured to control a pressure of each of the pressure chambers individually through the pressure regulators,

wherein the operation controller is configured to:

obtain information related to a specific position, which is a part of a circumference of the substrate, and calculate a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate; and

control the pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the control target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the operation controller is configured to control at least one of a rotational speed of the polishing head and a rotational speed of the polishing table so that the film thickness sensor crosses the control target area.

[Claim 11] The polishing apparatus according to claim 10, wherein the operation controller is configured to:

determine a reference position and a relative angle of the polishing head based on a relationship between the reference position of a circumferential angle of the substrate and the rotational angle of the polishing head; and

control at least one of the rotational speed of the polishing head and the

rotational speed of the polishing table based on the determined relative angle.

[Claim 12] A polishing method of pressing a substrate on a polishing surface of a polishing pad by a polishing head having a plurality of concentrically divided pressure chambers, comprising:

obtaining information related to a specific position, which is a part of a circumference of the substrate, and calculating a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate;

controlling a pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the target film thickness value and the average film thickness value of the entire substrate is reduced,

comprising identifying the specific position based on a film thickness of the substrate measured before polishing.

[Claim 13] A polishing method of pressing a substrate on a polishing surface of a polishing pad by a polishing head having a plurality of concentrically divided pressure chambers, comprising:

obtaining information related to a specific position, which is a part of a circumference of the substrate, and calculating a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate;

controlling a pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the target film thickness value and the average film thickness value of the entire substrate is reduced,

comprising:

determining a maximum film thickness position at which a maximum film thickness value is obtained and a minimum film thickness position at which a minimum

film thickness value is obtained based on a film thickness of the substrate measured before polishing; and

determining at least one of the maximum film thickness position and the minimum film thickness position as the specific position.

[Claim 14] A polishing method of pressing a substrate on a polishing surface of a polishing pad by a polishing head having a plurality of concentrically divided pressure chambers, comprising:

obtaining information related to a specific position, which is a part of a circumference of the substrate, and calculating a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate;

controlling a pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the target film thickness value and the average film thickness value of the entire substrate is reduced,

comprising:

determining a maximum film thickness value and a minimum film thickness value based on a film thickness of the substrate measured before polishing;

calculating a difference between the average film thickness value of the entire substrate and the maximum film thickness value, and a difference between the average film thickness value of the entire substrate and the minimum film thickness value; and

determining a position on the substrate where the film thickness value with a largest difference is obtained as the specific position.

[Claim 15] A polishing method of pressing a substrate on a polishing surface of a polishing pad by a polishing head having a plurality of concentrically divided pressure chambers, comprising:

obtaining information related to a specific position, which is a part of a

circumference of the substrate, and calculating a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate;

controlling a pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the control target film thickness value corresponds to at least one of a maximum film thickness value and a minimum film thickness value determined based on a film thickness of the substrate measured before polishing.

[Claim 16] A polishing method of pressing a substrate on a polishing surface of a polishing pad by a polishing head having a plurality of concentrically divided pressure chambers, comprising:

obtaining information related to a specific position, which is a part of a circumference of the substrate, and calculating a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate;

controlling a pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the target film thickness value and the average film thickness value of the entire substrate is reduced,

wherein the control target film thickness value is an average value of the film thickness values within the control target area.

[Claim 17] A polishing method of pressing a substrate on a polishing surface of a polishing pad by a polishing head having a plurality of concentrically divided pressure chambers, comprising:

obtaining information related to a specific position, which is a part of a circumference of the substrate, and calculating a control target film thickness value in a

control target area including the specific position and an average film thickness value of the entire substrate;

controlling a pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the target film thickness value and the average film thickness value of the entire substrate is reduced,

comprising:

measuring a film thickness of the control target area including the specific position during polishing based on an output signal of the film thickness sensor; and

controlling a pressure in the pressure chamber of the polishing head corresponding to the specific position based on the measured film thickness.

[Claim 18] A polishing method of pressing a substrate on a polishing surface of a polishing pad by a polishing head having a plurality of concentrically divided pressure chambers, comprising:

obtaining information related to a specific position, which is a part of a circumference of the substrate, and calculating a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate;

controlling a pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the target film thickness value and the average film thickness value of the entire substrate is reduced,

comprising:

dividing a plurality of pressing areas on the substrate divided corresponding to the pressure chambers into a specific pressing area including the control target area and another pressing area excluding the specific pressing area;

calculating an average film thickness value in the other pressing area based on the film thickness of the substrate; and

controlling the pressure in the pressure chamber corresponding to the other

pressure area so that a difference between the average film thickness value in the other pressure area and the average film thickness value of the entire substrate is reduced.

[Claim 19] A polishing method of pressing a substrate on a polishing surface of a polishing pad by a polishing head having a plurality of concentrically divided pressure chambers, comprising:

obtaining information related to a specific position, which is a part of a circumference of the substrate, and calculating a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate;

controlling a pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the target film thickness value and the average film thickness value of the entire substrate is reduced,

comprising:

obtaining information related to a reference position, which is a part of a circumference of a reference substrate that is different from the substrate;

detecting physical quantities corresponding to a film thickness of an area on the substrate including the reference position by the film thickness sensor during polishing of the reference substrate;

obtaining a plurality of data corresponding to the film thickness of the reference substrate based on a plurality of signals sent from the film thickness sensor; and

associating each of data with the film thickness of the reference substrate when obtaining each of data.

[Claim 20] The polishing method according to claim 19, comprising determining the reference position based on the film thickness of the reference substrate measured before polishing.

[Claim 21] A polishing method of pressing a substrate on a polishing surface of a polishing pad by a polishing head having a plurality of concentrically divided pressure chambers, comprising:

obtaining information related to a specific position, which is a part of a circumference of the substrate, and calculating a control target film thickness value in a control target area including the specific position and an average film thickness value of the entire substrate;

controlling a pressure in the pressure chamber of the polishing head corresponding to the specific position so that a difference between the target film thickness value and the average film thickness value of the entire substrate is reduced,

comprising controlling at least one of a rotational speed of the polishing head and a rotational speed of the polishing table so that the film thickness sensor crosses the control target area by rotating of the polishing table that supports the polishing pad.

[Claim 22] The polishing method according to claim 21, comprising:

determining a reference position and a relative angle of the polishing head based on a relationship between the reference position of a circumferential angle of the substrate and a rotational angle of the polishing head; and

controlling at least one of the rotational speed of the polishing head and the rotational speed of the polishing table based on the determined relative angle.

[Claim 23] A polishing apparatus, comprising:

a polishing table supporting a polishing pad;

a polishing head having a plurality of concentrically divided pressure chambers, for pressing a substrate against a polishing surface of the polishing pad;

a plurality of pressure regulators coupled to the pressure chambers;

a film thickness sensor embedded in the polishing table, the film thickness sensor outputting a signal corresponding to a film thickness of the substrate; and

an operation controller configured to control a pressure of each of the pressure chambers individually through the pressure regulators,

wherein the operation controller is configured to:

identifying a maximum film thickness value and a minimum film thickness value from the film thickness of the substrate obtained during polishing of the substrate by the film thickness sensor;

identifying at least one of a pressure chamber corresponding to a position of the substrate at which the maximum film thickness value is detected and a pressure chamber corresponding to a position of the substrate at which the minimum film thickness value is detected;

controlling the pressure of the pressure chamber associated with the maximum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the maximum film thickness value is less than the average film thickness value of the entire substrate when controlling the pressure of the pressure chamber associated with the maximum film thickness value; and

controlling the pressure of the pressure chamber associated with the minimum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the minimum film thickness value is higher than the average film thickness value of the entire substrate when controlling the pressure of the pressure chamber associated with the minimum film thickness value.

[Claim 24] The polishing apparatus according to claim 23, wherein the operation controller is configured to identify the maximum film thickness value and the minimum film thickness value based on the film thickness of the substrate obtained at regular time intervals during polishing the substrate.

[Claim 25] The polishing apparatus according to claim 24, wherein the operation controller is configured to:

calculating a polishing speed during polishing from the film thickness of the substrate obtained by the film thickness sensor;

calculating the amount of change in the film thickness of the substrate between an obtaining time when the film thickness of the substrate is obtained by the film thickness sensor at each measurement point of the substrate and a reference time, based on the polishing speed;

correcting the film thickness of the substrate obtained during polishing of the substrate in the time intervals using the amount of change as a correction value; and

identifying the maximum film thickness value and the minimum film thickness value based on the corrected film thickness of the substrate.

[Claim 26] The polishing apparatus according to any one of claims 23 to 25, wherein the operation controller is configured to determine in advance by a recipe setting whether to control the pressure of the pressure chamber associated with the maximum film thickness value so that the average thickness value of the substrate corresponding to the pressure chamber associated with the maximum thickness value is less than the average thickness value of the entire substrate, or to control the pressure of the pressure chamber associated with the minimum film thickness value so that the average thickness value of the substrate corresponding to the pressure chamber associated with the minimum film thickness value is higher than the average thickness value of the entire substrate, when the pressure chamber associated with the maximum film thickness value and the pressure chamber associated with the minimum film thickness value are the same pressure chamber.

[Claim 27] The polishing apparatus according to any one of claims 23 to 25, wherein the operation controller is configured to:

compare a first difference between the maximum film thickness value and the average film thickness value of the entire substrate and a second difference

between the minimum film thickness value and the average film thickness value of the entire substrate when the pressure chamber associated with the maximum film thickness value and the pressure chamber associated with the minimum film thickness value are the same pressure chamber;

control the pressure of the pressure chamber associated with the maximum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the maximum film thickness value is less than the average film thickness value of the entire substrate when the first difference is higher than the second difference; and

control the pressure of the pressure chamber associated with the minimum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the minimum film thickness value is higher than the average film thickness value of the entire substrate when the second difference is higher than the first difference.

[Claim 28] The polishing apparatus according to any one of claims 23 to 25, wherein the operation controller is configured to:

compare a first difference between the maximum film thickness value and an average film thickness value in a pressing area corresponding to the maximum film thickness value and the second difference between the minimum film thickness value and the average film thickness value in the pressing area corresponding to the minimum film thickness value when the pressure chamber associated with the maximum film thickness value and the pressure chamber associated with the minimum film thickness value are the same pressure chamber;

control the pressure of the pressure chamber associated with the maximum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the maximum film thickness value is less than the average film thickness value of the entire substrate when the first

difference is higher than the second difference; and

control the pressure of the pressure chamber associated with the minimum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the minimum film thickness value is higher than the average film thickness value of the entire substrate when the second difference is higher than the first difference.

[Claim 29] A polishing method of pressing a substrate on a polishing surface of a polishing pad by a polishing head having a plurality of concentrically divided pressure chambers, comprising:

identifying a maximum film thickness value and a minimum film thickness value from a film thickness of the substrate obtained during polishing of the substrate;

identifying at least one of a pressure chamber corresponding to a position of the substrate at which the maximum film thickness value is detected and a pressure chamber corresponding to a position of the substrate at which the minimum film thickness value is detected;

controlling the pressure of the pressure chamber associated with the maximum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the maximum film thickness value is less than the average film thickness value of the entire substrate when controlling the pressure of the pressure chamber associated with the maximum film thickness value; and

controlling the pressure of the pressure chamber associated with the minimum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the minimum film thickness value is higher than the average film thickness value of the entire substrate when controlling the pressure of the pressure chamber associated to the minimum film thickness value.

[Claim 30] The polishing method according to claim 29, comprising identifying the

maximum film thickness value and the minimum film thickness value based on the film thickness of the substrate obtained at regular time intervals during polishing the substrate.

[Claim 31] The polishing method according to claim 30, comprising:

calculating a polishing speed during polishing from the film thickness of the substrate;

calculating the amount of change in the film thickness of the substrate between an obtaining time when the film thickness of the substrate is obtained at each measurement point of the substrate and a reference time, based on the polishing speed;

correcting the film thickness of the substrate obtained during polishing of the substrate in the time intervals using the amount of change as a correction value; and

identifying the maximum film thickness value and the minimum film thickness value based on the corrected film thickness of the substrate.

[Claim 32] The polishing method according to any one of claims 29 to 31, comprising: determining in advance by a recipe setting whether to control the pressure of the pressure chamber associated with the maximum film thickness value so that the average thickness value of the substrate corresponding to the pressure chamber associated with the maximum thickness value is less than the average thickness value of the entire substrate when the pressure chamber associated with the maximum film thickness value and the pressure chamber associated with the minimum film thickness value are the same pressure chamber, or to control the pressure of the pressure chamber associated with the minimum film thickness value so that the average thickness value of the substrate corresponding to the pressure chamber associated with the minimum film thickness value is higher than the average thickness value of the entire substrate.

[Claim 33] The polishing method according to any one of claims 29 to 31, comprising:

comparing a first difference between the maximum film thickness value and the average film thickness value of the entire substrate and a second difference between the minimum film thickness value and the average film thickness value of the entire substrate when the pressure chamber associated with the maximum film thickness value and the pressure chamber associated with the minimum film thickness value are the same pressure chamber;

controlling the pressure of the pressure chamber associated with the maximum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the maximum film thickness value is lower than the average film thickness value of the entire substrate when the first difference is higher than the second difference; and

controlling the pressure of the pressure chamber associated with the minimum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the minimum film thickness value is higher than the average film thickness value of the entire substrate when the second difference is higher than the first difference.

[Claim 34] The polishing method according to any one of claims 29 to 31, comprising:

comparing a first difference between the maximum film thickness value and an average film thickness value in the pressing area corresponding to the maximum film thickness value and the second difference between the minimum film thickness value and the average film thickness value in the pressing area corresponding to the minimum film thickness value when the pressure chamber associated with the maximum film thickness value and the pressure chamber associated with the minimum film thickness value are the same pressure chamber;

controlling the pressure of the pressure chamber associated with the maximum film thickness value so that the average film thickness value of the substrate

corresponding to the pressure chamber associated with the maximum film thickness value is less than the average film thickness value of the entire substrate when the first difference is higher than the second difference; and

controlling the pressure of the pressure chamber associated with the minimum film thickness value so that the average film thickness value of the substrate corresponding to the pressure chamber associated with the minimum film thickness value is higher than the average film thickness value of the entire substrate when the second difference is higher than the first difference.

[Claim 35] A polishing method of pressing a substrate against a polishing surface of a polishing pad by a polishing head having a plurality of pressure chambers including a specific pressure chamber, comprising:

a first polishing process of polishing the substrate under a first polishing condition; and

a second polishing process of polishing the substrate under a second polishing condition determined based on a first polishing profile along a radial direction of a specific area of the substrate corresponding to the specific pressure chamber, which is obtained by previously polishing a substrate different from the substrate under the first polishing condition,

wherein the second polishing condition comprises a polishing condition determined in advance to form a second polishing profile having a distribution opposite to the distribution of the first polishing profile, and

wherein the second polishing process is performed after the first polishing process.

[Claim 36] The polishing method according to claim 35, wherein the specific pressure chamber comprises an edge pressure chamber configured to press against an outermost periphery of the substrate.

[Claim 37] The polishing method according to claim 35 or 36, wherein the second polishing condition comprises a polishing condition determined by adjusting the pressure of a pressure chamber other than the specific pressure chamber.

[Claim 38] The polishing method according to any one of claims 35 to 37, wherein the second polishing condition comprises a polishing condition determined by adjusting the pressure of adjacent pressure chamber adjacent to an edge pressure chamber configured to press an outermost periphery of the substrate.

[Claim 39] The polishing method according to any one of claims 35 to 38, wherein the second polishing condition comprises a polishing condition determined by adjusting a pressing force of a retaining ring arranged around an outermost periphery of the substrate against the polishing surface.

[Claim 40] The polishing method according to any one of claims 35 to 39, wherein the first polishing condition comprises a polishing condition of polishing the substrate while feedback controlling the pressure of each of the pressure chambers based on the film thickness of the substrate corresponding to each of the pressure chambers, measured using a film thickness sensor, during polishing.

[Claim 41] The polishing method according to any one of claims 35 to 40, comprising polishing the substrate under the first polishing condition, and polishing the substrate under the second polishing condition after meeting a predetermined switching condition.

[Claim 42] The polishing method according to claim 41, comprising switching from the first polishing condition to the second polishing condition, as the switching

condition, when a difference between a maximum value and a minimum value of the film thicknesses in the specific area is larger than a predetermined threshold value.

[Claim 43] The polishing method according to claim 41, comprising switching from the first polishing condition to the second polishing condition, as the switching condition, based on a time required to resolve a difference between a maximum value and a minimum value of the film thickness in the specific area by polishing under the second polishing condition and a remaining polishing time to a final target film thickness.

[Claim 44] The polishing method according to any one of claims 35 to 43, wherein the specific pressure chamber comprises an edge pressure chamber configured to press on an outermost periphery of the substrate, and

comprising controlling the pressure of the edge pressure chamber based on the second polishing condition, and controlling the pressure of an other pressure chamber except the edge pressure chamber based on the first polishing condition.