

ring-shaped member, and

a second ring-shaped member located below the membrane, and holding a wafer to be polished; and

a polishing pad with which the lower surface of the wafer to be polished and the lower surface of the second ring-shaped member come in contact at the time of polishing,

a space part formed by closing the opening of the first ring-shaped member by the plate-shaped member and the membrane has a central region and an outer peripheral region partitioned from the central region,

the polishing condition determining part,

determining a difference in pressure between a pressure P_c to be applied to the central part of the wafer to be polished by introducing a gas into the central region and a pressure P_e to be applied to the outer peripheral part of the wafer to be polished by introducing a gas into the outer peripheral region based on the in-plane thickness distribution information acquire for a wafer to be polished or a wafer subjected to the same processing treatment as that for the wafer to be polished,

determining any one pressure of P_c and P_e , and determining the other pressure based on the determined pressure and the difference in pressure,

determining the pressure P_g to be applied from the head main body part downward by pressing the head main body part, based on a set value P_r of a contact pressure to be applied to the lower surface of the second ring-shaped member due to contact with the polishing pad at the time of polishing, and

with the determined P_g , P_c , and P_e applied thereto, bringing the lower surface of the wafer to be polished into contact with the polishing pad to conduct polishing.

[0016] In one embodiment, the above polishing condition determining part can determine the P_g based on the ratio P_r/P_t of the P_r and a reference value P_t of the contact pressure to be applied to the lower surface of the second ring-shaped member, and the ratio P_e/P_c of the P_e and the $\frac{P_c}{P_e}$.

[0017] In one embodiment, the above polishing condition determining part can determine the P_g by calculating P_g from the mathematical relation of the ratio P_r/P_t , the ratio P_e/P_c , and the P_g .

[0018] In one embodiment, the above mathematical relation can be the equation A previously shown.

[0019] In one embodiment, the above ratio P_r/P_t can fall within the range of 0.8 to 1.2.