WHAT IS CLAIMED IS:

1. A wafer grinding method for grinding, by a grindstone, a reverse side of a wafer formed on a face side thereof with a plurality of devices, the wafer grinding method comprising:

a protective member forming step of covering a whole area of the face side of the wafer with a protective member;

a holding step of holding the wafer by a chuck table with the protective member therebetween; and

a grinding step of grinding the reverse side of the wafer by the grindstone while supplying grinding water containing a surfactant to the grindstone and the wafer at a contact region between the grindstone and the wafer;

wherein, in the grinding step, a concentration of the surfactant contained in the grinding water is in a range of 0.01% to 0.2%, and

wherein the grinding water containing the surfactant is supplied to the contact region to separate and remove, from the grinding water by an action of the surfactant, abrasive grains having fallen off from the grindstone during grinding.

2. The wafer grinding method according to claim 1, wherein the grinding step includes:

a rough grinding step of performing rough grinding of the reverse side of the wafer by grindstones of a rough grinding unit; and

a finish grinding step of performing finish grinding of the reverse side of the wafer by grindstones of a finish grinding unit,

wherein the grindstones of the finish grinding unit include abrasive grains finer than abrasive grains of the grindstones of the rough grinding unit, and

wherein the grinding water containing the surfactant is supplied to a contact region between the grindstones of the rough grinding unit and the wafer in the rough grinding step and to a contact region between the grindstones of the finish grinding unit and the wafer in the finish grinding step.