What is claimed is:

1. A load measuring apparatus that measures a load applied to a substrate from a roll cleaning tool of a substrate cleaning apparatus, the load measuring apparatus comprising:

a waterproof load cell including an elongated load measuring surface having a length that is substantially equal to a diameter of the substrate to be cleaned on which the load is being applied by the roll cleaning tool of the substrate cleaning apparatus; and

a base plate having a recess at a center thereof that accommodates the waterproof load cell,

wherein the elongated load measuring surface of the waterproof load cell is configured to be pressed directly by the roll cleaning tool of the substrate cleaning apparatus to be used for cleaning the substrate while a cleaning liquid is supplied to the roll cleaning tool thereby measuring the load applied to the waterproof load cell by the roll cleaning tool.

2. The load measuring apparatus of claim 1, wherein the load measuring surface is a flat surface.

3. The load measuring apparatus of claim 1, wherein a plurality of arc-shaped cutout portions are formed in an edge of the base plate, and a distance from a center of the base plate to the cutout portions is substantially equal to a radius of the substrate.

4. A load measuring method that measures a load applied to a substrate from a roll cleaning tool, the load measuring method comprising:

holding a load measuring apparatus including a waterproof load cell by a substrate holding mechanism, the waterproof load cell including a load measuring surface having a length that is substantially equal to a diameter of the substrate;

pressing the roll cleaning tool against the waterproof load cell while rotating the roll cleaning tool around an axial center thereof; and

measuring the load applied to the waterproof load cell from the roll cleaning tool while supplying a cleaning liquid to the roll cleaning tool that is rotating.

5. The method of claim 4, further comprising: measuring a deformed amount of the roll cleaning tool while the roll cleaning tool is rotated and pressed against the waterproof load cell.

6. The method of claim 5, further comprising:

acquiring a plurality of measured values of the load and a plurality of measured values of the deformed amount of the roll cleaning tool by repeating the measuring the load and the deformed amount of the roll cleaning tool while changing a force to press the roll cleaning tool against the waterproof load cell; and

deriving a relationship between the load and the deformed amount of the roll cleaning tool from the plurality of measured values of the load and the plurality of measured values of the deformed amount.

7. The method of claim 5, further comprising:

acquiring a plurality of measured values of the load by repeating the measuring the load while changing a rotating speed of the roll cleaning tool; and

deriving a relationship between the load and the rotating speed of the roll cleaning tool from the plurality of measured values of the load and corresponding rotating speeds of the roll cleaning tool.

8. The load measuring apparatus of claim 1, further comprising a load display configured to display the load applied to the waterproof load cell by the roll cleaning tool, wherein the load display is connected to the waterproof load cell through a cable.

9. The load measuring apparatus of claim 1, wherein the substrate cleaning apparatus includes a displacement sensor configured to measure a deformed amount of the roll cleaning tool when the roll cleaning tool is contacted to the waterproof load cell of the load measuring apparatus to measure the load applied to the waterproof load cell by the roll cleaning tool.

10. The load measuring apparatus of claim 1, wherein the base plate is made of a metal.

11. The load measuring apparatus of claim 10, wherein the base plate is formed with a lightening hole.

12. The load measuring apparatus of claim 8, wherein at least a portion of the cable is fixed to the base plate.

13. A load measuring apparatus that measures a load applied to a substrate from a roll cleaning tool, the load measuring apparatus comprising: a waterproof load cell including a load measuring surface having a length that is substantially equal to a diameter of the substrate; and a base plate that supports the waterproof load cell, wherein a plurality of arc-shaped cutout portions are formed in an edge of the base plate, and a distance from a center of the base plate to the cutout portions is substantially equal to a radius of the substrate.