

FILTERING A DRAIN PATH IN AN ELECTRODEPOSITION TOOL**BACKGROUND**

[0001] Electrodeposition is commonly used in integrated circuit manufacturing processes to form electrically conductive structures. Electrodeposition also may be referred to as electroplating, electrofill, and variants thereof. Electrodeposition involves electrochemically reducing metal ions in an electroplating solution onto a surface to deposit solid metal onto the surface. Electrodeposition can be used to fill recessed patterns formed in a semiconductor substrate surface with a metal. In an example process, a wafer surface comprising a seed layer of metal is exposed to an electroplating solution comprising metal ions. An electric current is applied to reduce the metal ions. The electrochemical reduction grows a thicker layer of metal over the seed layer to fill recessed patterns in the wafer surface.

SUMMARY

[0002] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter. Furthermore, the claimed subject matter is not limited to implementations that solve any or all disadvantages noted in any part of this disclosure.

[0003] Examples are disclosed that relate to screens for protecting drain components in an electrodeposition tool. One example provides an electrodeposition tool. The electrodeposition tool comprises a filter bowl. The filter bowl comprises an inlet and an outlet. The filter bowl further comprises a filter interface configured to position a filter along a fluidic path between the inlet and the outlet. The filter bowl further comprises a drain opening positioned to drain an inlet side of the filter bowl when the filter is positioned in the filter interface. The electrodeposition tool further comprises a drain path leading from the drain opening, the drain path comprising a drain component. The electrodeposition tool further comprises a screen for filtering debris from electroplating solution. The screen is disposed within a fluidic path between the inlet and the drain component.

[0004] In some such examples, the screen is positioned between the inlet and the drain opening.

[0005] Additionally or alternatively, in some such examples, the screen is welded to an interior surface of the filter bowl.

[0006] Additionally or alternatively, in some such examples, the drain path comprises a drain line, and the screen is positioned within the drain line between the drain opening and the drain component.

[0007] Additionally or alternatively, in some such examples, the screen is integrated into an inlet of the drain component.

[0008] Additionally or alternatively, in some such examples, the drain component comprises a pump.

[0009] Additionally or alternatively, in some such examples, the drain component comprises a valve.

[0010] Additionally or alternatively, in some such examples, the screen comprises a mesh size of 0.01 to 0.06 inches.

[0011] Additionally or alternatively, in some such examples, the electrodeposition tool comprises one or more pumps to pump the electroplating solution through a circulation loop at a pressure of 15 to 45 pounds per square inch (PSI) when the filter is positioned within the filter interface, the circulation loop including the filter bowl.

[0012] Another example provides a filter bowl. The filter bowl comprises an inlet and an outlet. The filter bowl further comprises a filter interface configured to position a filter along a fluidic path between the inlet and the outlet. The filter bowl further comprises a drain opening positioned to drain an inlet side of the filter bowl when the filter is positioned in the filter interface. The filter bowl further comprises a screen positioned along a fluidic path between the inlet and the drain opening.

[0013] In some such examples, the screen comprises a mesh size of 0.01 to 0.06 inches.

[0014] Additionally or alternatively, in some such examples, the screen is welded to an interior surface of the filter bowl.

[0015] Additionally or alternatively, in some such examples, the screen comprises a concave cross section.

[0016] Additionally or alternatively, in some such examples, the screen comprises a prominence to prevent the filter from moving out of the filter interface.

[0017] Another example provides an electrodeposition tool. The electrodeposition tool comprises a plating cell. The electrodeposition tool further comprises a filter bowl for filtering electroplating solution provided to the plating cell. The filter bowl comprises an inlet configured to introduce electroplating solution to the filter bowl. The filter bowl further comprises an outlet configured for flowing electroplating solution out from the filter bowl. The filter bowl further comprises a filter interface configured to position a filter along a fluidic path between the inlet and the outlet. The filter bowl further comprises a drain opening. The filter bowl further comprises a screen positioned along a fluidic path between the inlet and the drain opening. The electrodeposition tool further comprises a drain path positioned to drain an inlet side of the filter bowl through the drain opening when the filter is positioned in the filter interface.

[0018] In some such examples, the screen comprises a prominence to prevent the filter from moving out of the filter interface.

[0019] Additionally or alternatively, in some such examples, the screen is welded to an interior surface of the filter bowl.

[0020] Additionally or alternatively, in some such examples, the drain path comprises a valve, and the filter is configured to filter debris from entering the valve.

[0021] Additionally or alternatively, in some such examples, the screen comprises a mesh size that is smaller than a clearance of the valve in an open position.

[0022] Additionally or alternatively, in some such examples, the screen comprises a mesh size of 0.01 to 0.06 inches.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] FIG. 1 schematically shows an example electrodeposition tool that comprises a plating cell and a filter bowl to filter electroplating solution that flows through the plating cell.

[0024] FIG. 2 shows a sectional view of an example filter bowl comprising a screen positioned to protect a drain component from debris.

[0025] FIG. 3 schematically shows a top view of an example screen comprising a plurality of openings.

[0026] FIG. 4 shows a sectional side view of the screen of FIG. 3.

[0027] FIGS. 5A-5B schematically illustrate a clearance size of an example control valve.

[0028] FIG. 6 schematically shows an example filter bowl comprising a screen that includes a prominence to help position a filter in a filter interface of the filter bowl.

[0029] FIG. 7 schematically shows an example filter bowl and drain line that includes an inline screen.

[0030] FIG. 8 schematically shows an example filter bowl and drain line that includes a drain component comprising an integrated screen.

[0031] FIG. 9 schematically shows an example valve comprising an integrated screen.

[0032] FIG. 10 schematically shows an example pump comprising an integrated screen.

DETAILED DESCRIPTION

[0033] The term “debris” generally represents solids, such as chemical precipitates or contaminant particles, in an electroplating solution.

[0034] The term “drain component” generally represents a component along a drain path leading from a filter bowl. Example drain components include valves and pumps.

[0035] The term “drain opening” generally represents an opening of a filter bowl configured to interface with a drain path.

[0036] The term “drain path” generally represents a fluidic path leading from a drain opening of a filter bowl for electroplating solution to be removed from the filter bowl.

[0037] The term “electrodeposition” generally represents a process comprising electrochemically reducing metal ions in an electroplating solution onto a surface to deposit solid metal onto the surface.

[0038] The term “electrodeposition tool” generally represents a machine configured to perform an electrodeposition process to deposit a layer of metal onto a surface.

[0039] The term “filter” generally represents a membrane that allows flow of electroplating solution and prevents flow of at least some solids in the electroplating solution.

[0040] The term “filter bowl” generally represents a component of an electrodeposition tool that is configured to hold a filter to filter electroplating solution that is moving along an electroplating solution circulation path.

[0041] The term “filter interface” generally represents a structure of a filter bowl configured to position a filter between an inlet and outlet of the filter bowl.

[0042] The term “inlet” generally represents an opening in a filter bowl for introducing electroplating solution into the filter bowl.

[0043] The term “inlet side” generally represents a volume of a filter bowl between an inlet and a filter within the filter bowl.

[0044] The term “outlet” generally represents an opening of a filter bowl for outflowing electroplating solution that has passed through a filter.

[0045] The term “outlet side” generally represents a volume of a filter bowl between a filter and an outlet of the filter bowl.

[0046] The term “screen” generally represents a component for catching solids in a fluid flow. A screen comprises a plurality of openings through which electroplating solution can flow. Solids that are larger than a mesh size of the openings are prevented from passing through the screen.

[0047] An electrodeposition tool includes a plating cell comprising a cathode chamber and an anode chamber. The cathode chamber contains a catholyte solution, and the anode chamber contains an anolyte solution. A substrate comprising a cathode layer is positioned in the cathode chamber. Metal ions in the catholyte are electrochemically reduced at the cathode to grow a metal layer on the substrate. The anode chamber contains an anolyte solution and an anode. Chemical species are oxidized in the anode chamber during an electrodeposition process. The term “electroplating solution” is used herein to refer generally to both catholyte solutions and anolyte solutions.

[0048] Electroplating solutions are circulated around circulation loops that include the plating cell. The presence of solids (e.g. chemical precipitates and/or contaminant particles) in the electroplating solution can affect the electrodeposition process. As such, an electrodeposition tool can include a filter within the circulation loop to remove solids from the electroplating solution. The filter can be positioned within a filter bowl. Electroplating solution can be filtered by pumping the electroplating solution around a circulation loop from the plating cell into the filter bowl and through the filter before returning to the plating cell.

[0049] Periodic maintenance of the electrodeposition tool can include draining the electroplating solution from the filter bowl and cleaning or replacing the filter. However, solid materials in the filter bowl can damage drain components, such as a

valve or pump used to drain plating fluid from the filter bowl. Such solid materials are also referred to as debris herein. Debris can clog a valve or pump. For example, a particle that is larger in dimension than a clearance of a valve opening in a drain path can become lodged in the valve opening. This can damage the valve. Such damage can lead to a poor valve seal. This can cause electroplating solution to leak through the drain. The resulting loss of electroplating solution can be expensive. Further, damage to valves or other drain components can result in costly repairs and machine downtime.

[0050] Accordingly, examples are disclosed that relate to the use of a screen for protecting a drain component from debris. Briefly, a filter bowl of an electrodeposition tool can comprise an inlet, an outlet, and a filter interface configured to hold a filter. The filter bowl further comprises a drain opening. The drain opening is positioned to drain the filter bowl when the filter is positioned in the filter interface. The electrodeposition tool further comprises a drain path leading from the drain opening. The drain path includes one or more drain components, such as a valve and/or pump. The electrodeposition tool further comprises a screen for filtering debris from the electroplating solution. The screen is positioned along a fluidic path between the filter bowl and the drain component. In this manner, the screen helps protect the drain component from debris when electroplating solution is drained through the drain path. By filtering debris, the screen helps avoid damage to the drain component. This helps avoid leaking of the electroplating solution. This also helps avoid repairs to drain components and downtime of electrodeposition tools.

[0051] FIG. 1 schematically shows an example electrodeposition tool 100 comprising a plating cell 102. Plating cell 102 can be used to expose a wafer to an electroplating solution during an electrodeposition process. Electrodeposition tool 100 further comprises flow control hardware 104A, 104B for pumping electroplating solution through the plating cell 102. Flow control hardware 104A, 104B can comprise any suitable hardware, such as one or more valves and one or more pumps. Electrodeposition tool 100 further comprises a controller 108 to operate plating cell 102 and flow control hardware 104A, 104B.

[0052] As mentioned above, electroplating solution can become contaminated with debris, such as precipitates and/or contaminant particles. As such, electrodeposition tool 100 further comprises a filter bowl 110 to help filter the electroplating solution. Filter bowl 110 comprises an inlet 112 in fluid connection with flow control hardware 104A. Filter bowl 110 also comprises an outlet 114 in fluid

connection with flow control hardware 104B. Flow control hardware 104A, 104B can pump electroplating solution from plating cell 102 to inlet 112 of filter bowl 110. Additionally, flow control hardware 104B can pump electroplating solution from outlet 114 to plating cell 102. In this manner, filter bowl 110 can filter debris from electroplating solution flowing in a circulation loop that includes plating cell 102, flow control hardware 104A, filter bowl 110, and flow control hardware 104B.

[0053] Electrodeposition tool 100 further comprises a drain path 118 for draining electroplating solution from filter bowl 110. Drain path 118 comprises a drain line 120 and a drain component 122 located along drain path 118. Examples of drain components include valves and pumps. In some examples, a drain path includes a valve and a pump. Controller 108 is configured to control drain component 122, for example, by opening a valve, closing a valve, or operating a pump. Electrodeposition tool 100 can be operated with a relatively high fluid pressure inside the filter bowl 110, such as a pressure ≥ 15 PSI (pounds per square inch). In some such examples, the electrodeposition tool can operate with a fluid pressure of 15 to 45 PSI. As some pumps can leak under relatively high fluid pressures, a valve can be positioned upstream from a pump in a drain path to avoid leakage through the pump. Any suitable type of valve can be used as a drain path valve in an electrodeposition tool. Examples include diaphragm valves, globe valves, and gate valves. In some examples, the valve is a control valve. In some examples, the valve comprises a pneumatic valve and spring actuator. In other examples, a valve can be omitted. For example, a valve can be omitted when operating with relatively low fluid pressure or when using a pump configured to avoid leaking under high fluid pressure. Further, in some examples, a pump can be omitted. For example, a pump can be omitted when the filter bowl can be drained by gravity.

[0054] Likewise, any suitable pump can be used in a drain path of an electrodeposition tool. Examples include peristaltic pumps, centrifugal pumps, and diaphragm pumps, such as an air operated dual diaphragm (AODD) pump.

[0055] As mentioned above, debris in electroplating solution can damage the drain component 122. As such, electrodeposition tool 100 further comprises a screen to help protect drain component 122 from debris. The screen can be positioned at any suitable location along the fluidic pathway upstream of the drain component. In some examples, the screen can be positioned in the filter bowl between the inlet and/or outlet

and the drain opening. Examples of such placement of the screen are discussed in more detail below with reference to FIGS. 2-6. In further examples, the screen is an inline screen positioned in the drain path between the drain opening and the drain component. Such examples are discussed in more detail below with reference to FIG. 7. In still further examples, the screen can be integrated into an inlet of the drain component. Such examples are discussed in more detail below with reference to FIGS. 8-10.

[0056] FIG. 2 schematically shows an example filter bowl 200 comprising a screen positioned within an interior of the filter bowl 200. Filter bowl 200 is an example of filter bowl 110. Filter bowl 200 comprises an inlet 202, an outlet 204, and a filter interface 206. Filter interface 206 is configured to position a filter 208 along a fluidic path between inlet 202 and outlet 204. As such, filter 208 can filter electroplating solution flowing through filter bowl 200. The filter 208 divides filter bowl 200 into an inlet side 210 and an outlet side 212. Here, the “inlet side” 210 of filter bowl 200 refers to a volume of filter bowl 200 along the fluidic path between inlet 202 and filter 208. Likewise, the “outlet side” 212 of filter bowl 200 refers to a volume of filter bowl 200 along the fluidic path between filter 208 and outlet 204.

[0057] Filter bowl 200 further comprises a drain opening 214 for draining the filter bowl. Drain opening 214 is positioned on the inlet side 210 of filter bowl 200. FIG. 2 also shows a drain path 216 leading from drain opening 214. The drain path 216 comprises a drain component 218. Drain component 218 can comprise a valve or a pump, as examples. In some examples, a drain path can comprise two or more drain components, such as a valve and a pump.

[0058] To protect drain component 218 from debris, filter bowl 200 comprises a screen 230. Screen 230 is positioned along a fluidic path between inlet 202 and drain opening 214. Screen 230 can be positioned in any suitable location, including within drain opening 214. Placing screen 230 within the filter bowl 200 can allow for a screen comprising a greater surface compared to other placements. This can help avoid slow fluid flow through screen 230.

[0059] As shown in FIG. 2, screen 230 is coupled with an interior surface of filter bowl 200. In some examples, screen 230 is welded to the filter bowl 200. In other examples, screen 230 can be attached to the inside surface of filter bowl 200 in another manner, such as by an adhesive and/or one or more mechanical fasteners. In some examples, screen 230 can comprise notches and/or other mechanical keying features to help position the screen to complementary features in filter bowl 200.

[0060] Screen 230 can comprise any suitable material. Further, the interior surface of filter bowl 200 can comprise any suitable material. Examples include plastics, ceramics, and metals. In some examples, screen 230 can comprise polypropylene. In some examples, screen 230 can comprise a fluoropolymer, such as a perfluoroalkoxy alkane (PFA) or polyvinylidene difluoride (PVDF). In some examples, screen 230 can comprise polyethylene. In some examples, screen 230 and filter bowl 200 are formed at least partially from a plastic. In some such examples, the screen can be welded to a plastic portion of the filter bowl. In some examples, screen 230 and filter bowl 200 are formed at least partially from a metal. Examples of metals include aluminum and stainless steel. Screen 230 can be formed in any suitable manner. Example methods of forming screen 230 include molding and additive manufacturing.

[0061] A screen for filtering debris in a drain path of an electrodeposition tool filter bowl can comprise any suitable configuration. FIG. 3 shows a top view of an example screen 300. FIG. 4 shows a sectional side view of screen 300. Screen 300 is an example of screen 230. As shown in FIG. 3, screen 300 comprises a generally elliptical (e.g. circular) perimeter to fit within a similarly-shaped filter bowl. In other examples a screen can have a different shape, depending upon a shape of a filter bowl interior in which the screen will be located, for example. As shown in FIG. 4, screen 300 comprises raised sides to form a concave cross section. This can help in clearing debris from screen 300 during maintenance. In other examples, a screen can have a generally flat configuration, or a convex cross section with a raised center, as examples.

[0062] Screen 300 comprises a plurality of openings 302 that allow electroplating solution to flow through the screen. Screen 300 filters debris that is larger than a mesh size 304 of the screen. In other words, screen 300 filters debris that is too large to pass through the openings 302. In some examples, the screen comprises a mesh size of 0.01 to 0.06 inches. In other examples, a mesh size outside this range can be used.

[0063] In some examples, a mesh size is selected based on a configuration of a drain component. Returning to FIG. 2, screen 230 can comprise a mesh size that is selected based on a clearance size of a valve (e.g., drain component 218) along drain path 216. FIGS. 5A-5B schematically illustrate a clearance size of a valve 500. FIG. 5A shows valve 500 and valve cap 502 in a closed position where valve cap 502 is in contact with a base 504. FIG. 5B shows valve cap 502 in an open position. When in an open position, valve cap 502 is separated from base 504 by a clearance 506. Debris that

is approximately equal in size or larger than clearance 506 can clog valve 500. As such, a screen comprising a mesh size that is smaller than clearance 506 can help avoid clogging valve 500. In some examples, a mesh size can be selected that is half the clearance of the valve. As one example, a valve can comprise a clearance of approximately 0.06 inches. As such, a screen comprising a mesh size that is 0.03 inches or less can help filter debris that can clog the valve.

[0064] As mentioned above, filter interface 206 of filter bowl 200 is configured to position filter 208 within the filter bowl between inlet 202 and outlet 204. However, in some examples a filter can become loose. For example, a pressure imbalance (e.g., due to gas buildup) between the inlet side 210 and the outlet side 212 can cause filter 208 to slide out of filter interface 206. This can allow unfiltered electroplating solution to flow around filter 208. FIG. 6 shows an example filter bowl 600 that includes a prominence to help prevent the filter from sliding out of the filter interface. Filter bowl 600 is an example of filter bowl 110. Filter bowl 600 comprises an inlet 602, an outlet 604, and a filter interface 606. Filter interface 606 is configured to position a filter 608 along a fluidic path between inlet 602 and outlet 604. Filter bowl 600 further comprises a drain opening 614 for draining the filter bowl. Drain opening 614 is positioned on the inlet side 610 of filter bowl 600. FIG. 6 also shows a drain line 616 leading from drain opening 614. Drain line 616 comprises a drain component 618.

[0065] Filter bowl 600 comprises a screen 630 to protect drain component 618 from debris. Screen 630 comprises a prominence 632 below filter 608. Prominence 632 helps prevent filter 608 from sliding downward. Thus, prominence 632 can help position filter 608 in filter interface 606. This can help maintain a tight seal of filter 608 within filter interface 606.

[0066] As mentioned above, a screen can be positioned at any suitable location within the fluidic path between the inlet of the filter bowl and the drain component. FIG. 7 schematically shows an example filter bowl 700 that includes an in-line screen located in a drain line. Filter bowl 700 is an example of filter bowl 110. Filter bowl 700 comprises an inlet 702, an outlet 704, and a filter interface 706. Filter interface 706 is configured to position a filter 708 along a fluidic path between inlet 702 and outlet 704. Filter bowl 700 further comprises a drain opening 714 for draining the filter bowl. Drain opening 714 is positioned on the inlet side 710 of filter bowl 700.

[0067] FIG. 7 also shows a drain line 716 leading from drain opening 714. The drain line 716 leads to a drain component 718. The drain line 716 further comprises a

screen 730 positioned within the drain line 716. The screen 730 is positioned between the drain opening 714 and the drain component 718. In this manner, screen 730 can filter debris from electroplating solution drained from filter bowl 700 through drain line 716. This can help protect drain component 718 from clogging and avoid damage to drain component 718. Debris can be cleaned from screen 730 by, for example, removing drain line 716 and flushing drain line 716.

[0068] Next, FIG. 8 schematically shows an example filter bowl 800 with a screen that is integrated into a drain component. Filter bowl 800 is an example of filter bowl 110. Filter bowl 800 comprises an inlet 802, an outlet 804, and a filter interface 806. Filter interface 806 is configured to position a filter 808 along a fluidic path between inlet 802 and outlet 804. Filter bowl 800 further comprises a drain opening 814 for draining the filter bowl. Drain opening 814 is positioned on the inlet side 810 of filter bowl 800. FIG. 8 also shows a drain line 816 leading from drain opening 814. The drain line 816 leads to a drain component 818.

[0069] Drain component 818 comprises a screen 830 that is integrated into an inlet of drain component 818. In some examples, drain component 818 can comprise a valve. FIG. 9 schematically shows an example valve 900 that includes an integrated screen. Valve 900 comprises a valve cap 902 to allow or prevent flow of fluid through valve 900. Valve 900 further comprises a screen 904 that is integrated into an inlet 906 of valve 900. As such, screen 904 is upstream from valve cap 902. In this manner, screen 904 can filter debris from electroplating solution flowing through valve 900. By filtering debris, screen 904 can help avoid clogging and/or damage of valve 900.

[0070] In other examples, drain component 818 can comprise a pump. FIG. 10 schematically shows an example pump 1000 that includes an integrated screen. Pump 1000 comprises an air-operated dual diaphragm (AODD) pump. In other examples, any other suitable type of pump can be used. Examples include peristaltic pumps and centrifugal pumps. Pump 1000 comprises diaphragms 1002, 1004 that pump fluid through left and right channels, respectively. Pump 1000 further comprises an air distribution system 1006 to push diaphragms 1002, 1004. Pump 1000 further comprises one-way valves 1010, 1011, 1012, 1013 to control the direction of fluid flow through the left and right channels. One example of a one-way valve is a ball valve.

[0071] Pump 1000 further comprises a screen 1016 integrated into an inlet 1018 of pump 1000. As such, screen 1016 is upstream from one-way valves 1010, 1011, 1012, 1013. In this manner, screen 1016 can filter debris from electroplating solution

flowing through pump 1000. By filtering debris, screen 1016 can help avoid clogging and/or damage of pump 1000.

[0072] Returning to FIG. 8, screen 830 can be cleaned in any suitable manner. For example, drain component 818 can be removed to access the inlet of the drain component. Then, debris can be cleared from screen 830 in the inlet of drain component 818. In some examples, drain component 818 can be flushed.

[0073] Thus, the use of screens in an electrodeposition tool can help protect drain components from debris. This helps avoid damage to drain components and helps avoid leaking of electroplating solution. By avoiding damage to drain components, screens also can help avoid repairs and downtime of electrodeposition tools.

[0074] It will be understood that the configurations and/or approaches described herein are exemplary in nature, and that these specific examples or examples are not to be considered in a limiting sense, because numerous variations are possible. The specific routines or methods described herein may represent one or more of any number of processing strategies. As such, various acts illustrated and/or described may be performed in the sequence illustrated and/or described, in other sequences, in parallel, or omitted. Likewise, the order of the above-described processes may be changed.

[0075] The subject matter of the present disclosure includes all novel and non-obvious combinations and sub-combinations of the various processes, systems and configurations, and other features, functions, acts, and/or properties disclosed herein, as well as any and all equivalents thereof.

CLAIMS:

1. An electrodeposition tool, comprising:
a filter bowl comprising
an inlet,
an outlet,
a filter interface configured to position a filter along a fluidic path between the inlet and the outlet, and
a drain opening positioned to drain an inlet side of the filter bowl when the filter is positioned in the filter interface;
a drain path leading from the drain opening, the drain path comprising a drain component; and
a screen for filtering debris from electroplating solution, wherein the screen is disposed within a fluidic path between the inlet and the drain component.
2. The electrodeposition tool of claim 1, wherein the screen is positioned between the inlet and the drain opening.
3. The electrodeposition tool of claim 2, wherein the screen is welded to an interior surface of the filter bowl.
4. The electrodeposition tool of claim 1, wherein the drain path comprises a drain line, and the screen is positioned within the drain line between the drain opening and the drain component.
5. The electrodeposition tool of claim 1, wherein the screen is integrated into an inlet of the drain component.
6. The electrodeposition tool of claim 1, wherein the drain component comprises a pump.
7. The electrodeposition tool of claim 1, wherein the drain component comprises a valve.

8. The electrodeposition tool of claim 1, wherein the screen comprises a mesh size of 0.01 to 0.06 inches.
9. The electrodeposition tool of claim 1, further comprising one or more pumps to pump the electroplating solution through a circulation loop at a pressure of 15 to 45 pounds per square inch (PSI) when the filter is positioned within the filter interface, the circulation loop including the filter bowl.
10. A filter bowl, comprising:
 - an inlet;
 - an outlet;
 - a filter interface configured to position a filter along a fluidic path between the inlet and the outlet;
 - a drain opening positioned to drain an inlet side of the filter bowl when the filter is positioned in the filter interface; and
 - a screen positioned along a fluidic path between the inlet and the drain opening.
11. The filter bowl of claim 10, wherein the screen comprises a mesh size of 0.01 to 0.06 inches.
12. The filter bowl of claim 10, wherein the screen is welded to an interior surface of the filter bowl.
13. The filter bowl of claim 10, wherein the screen comprises a concave cross section.
14. The filter bowl of claim 10, wherein the screen comprises a prominence to prevent the filter from moving out of the filter interface.
15. An electrodeposition tool, comprising:
 - a plating cell;
 - a filter bowl for filtering electroplating solution provided to the plating cell, the filter bowl comprising
 - an inlet configured to introduce electroplating solution to the filter bowl,

an outlet configured for flowing electroplating solution out from the filter bowl,

a filter interface configured to position a filter along a fluidic path between the inlet and the outlet,

a drain opening, and

a screen positioned along a fluidic path between the inlet and the drain opening; and

a drain path positioned to drain an inlet side of the filter bowl through the drain opening when the filter is positioned in the filter interface.

16. The electrodeposition tool of claim 15, wherein the screen comprises a prominence to prevent the filter from moving out of the filter interface.

17. The electrodeposition tool of claim 15, wherein the screen is welded to an interior surface of the filter bowl.

18. The electrodeposition tool of claim 15, wherein the drain path comprises a valve, and the filter is configured to filter debris from entering the valve.

19. The electrodeposition tool of claim 18, wherein the screen comprises a mesh size that is smaller than a clearance of the valve in an open position.

20. The electrodeposition tool of claim 15, wherein the screen comprises a mesh size of 0.01 to 0.06 inches.