flows through the orifices of the tower, the distribution of gas decreases from the top orifice to the bottom orifice. This results in ineffective evacuation of water and oxygen from the microenvironment.

Another goal of purging is to remove airborne contaminants from the environment within the container. These contaminants are primarily trapped in the filtering mechanism in the purge ports and are effectively removed when the container is purged. However, the containers are reusable and prior to reuse must be cleaned. As a part of the cleaning process, a human operator must remove the purge tower and the purge port/filter mechanisms to keep water from accumulating in these devices. Contaminants are introduced into the microenvironment from the human operator during the process of removing/reinstalling the purge towers and purge ports/filters.

A need therefore exists for an improved purging method which solves the problems of evacuating the wafer container in a fast and efficient manner. In particular, a need exists for a purging method and apparatus that can allow the purge gas to accumulate in the tower so that as the gas accumulates and the pressure inside of the tower increases therefore the gas flows through the tower into the microenvironment and is evenly distributed between the wafers. Another need is to minimize or eliminate human operators from reaching inside the container. Currently, operators must reach inside the container to remove and reinstall the purge towers and purge ports/filters when the container is cleaned and returned to service.

## SUMMARY OF THE INVENTION

Embodiments of~~In view of the above mentioned problems,~~ the present invention provide~~s for~~ an improved system and method for purging a microenvironment to desired levels of relative humidity, oxygen, or particulates through the implementation of a purge gas delivery apparatus and method that provides even distribution of the purging gas within the microenvironment.

In a first aspect, there is provided a system for transporting substrates comprising: a substrate container having a container portion with an opening for loading/unloading substrates, a door adapted to sealably cover the opening; a substrate carrying section disposed in the transport container; an apparatus comprising an inlet tower adapted to be mounted to substrate container portion for admitting a gaseous working fluid to the interior of the container for purging the substrate container body with the gaseous working fluid; the inlet tower having a length and comprising a non porous polymer sleeve extending the length of the tower, one or more outlet regions arranged along the length of the tower, and an interior flow passageway extending the length of the tower, filter media positioned at each outlet region intermediate the one or more outlet regions and the interior flow passageway whereby the gaseous working fluid being admitted to the substrate container may be filtered as it passes through said filter media.

In a second aspect, there is provided a system for transporting substrates comprising: a substrate transport container having a container body with an opening and a wafer loading/unloading door adapted to sealably cover the opening; an apparatus for admitting a gaseous working fluid to the interior of the container comprising an inlet tower formed of porous barrier material surrounded by a non porous polymer sleeve and a filter in the tower formed of porous barrier material.

In a third aspect, there is provided a substrate container comprising: a substrate container having a container portion with an opening for loading/unloading substrates, a door adapted to sealably cover the opening; the substrate container having a substrate carrying region in the transport container and further comprising an inlet tower mounted to container portion in the interior of the for admitting a gaseous working fluid to the interior of the container for purging the wafer container body with the gaseous working fluid; the inlet tower having a length and one or more outlet regions arranged along the length of the tower, and an interior flow passageway extending the length of the tower, the tower comprising a filter media formed as a tubular structure extending the length of the tower, the tubular structure having an axial fluid flow passageway connecting to a purge port at the bottom of the container portion for allowing purge gas to flow up the tubular structure and to exit the tubular structure along the entire length of the tubular structure, the filter media defining the axial flow passage.

An additional advantage of an embodiment of the present invention is that the purge tower porous barrier may be composed of a hydrophobic material that prevents water from entering the purge tower during the cleaning process which consequently eliminates the need to remove the purge gas delivery apparatus during the cleaning process which avoids

introducing particles into the microenvironment from the removal and reinstallation process of the purge gas delivery apparatus after cleaning.

Further advantages of an embodiment of the invention are that the porous barrier may be formed into shapes that match the non-flat geometry of the purge tower and by resisting the flow of gas, the porous barrier allows for the purge gas to accumulate in the tower. As the gas accumulates, the pressure inside the tower increases and when the pressure is sufficient to overcome the barrier material, the gas flows through the barrier material into the wafer container and is evenly distributed among the installed wafers in the container.

A further advantage of an embodiment of the invention is that the purge tower significantly reduces the relative humidity level within the microenvironment in instances where the wafer access door has been removed.

A further advantage of an embodiment of the invention issi that the purge tower porous barrier improved purging efficiency from top to bottom of the microenvironment.

In one preferred embodiment, the microenvironment includes an inlet port and an outlet port, each including a check valve assembly and a purge tower connected to the inlet port and the outlet port for a clean, dry gaseous working fluid that is used to provide controlled low levels of moisture, oxygen, and particulate content around the materials contained in the microenvironment. The microenvironment container inlet port is connected with a gaseous working fluid source, and the outlet port is connected with an evacuation system. In operation, according to one embodiment, the tower includes a sealing grommet in the tower base portion that maintains a seal against the container shell to prevent undesired chemicals or particulates from entering into the interior of the wafer container. Thus, any flow between the interior and exterior of the wafer container is limited to passing through the passageway defined by the grommet. Types of fluid flows include the introduction of purging gases such as nitrogen into the interior of the wafer container. The fluid flow can be further limited by the porous barrier element. The porous barrier provides filtering to the purge gas to remove particulates as well as oxygen and humidity from the purge gas prior to the gas being introduced into the interior of the wafer container. The integral directional flow check valves operate at very low pressure differentials. In this embodiment, a porous membrane barrier is placed in the inlet tower directly behind the tower orifices. The membrane barrier improves the performance of the