

CLAIMS

What is claimed is:

1. A method for assessing health status of a processing chamber, comprising:
executing a recipe;
receiving processing data from a set of sensors during execution of said recipe;
analyzing said processing data utilizing a set of multi-variate predictive models;
generating a set of component wear data values;
comparing said set of component wear data values against a set of useful life threshold ranges; and

generating a warning if said set of component wear data values is outside of said set of useful life threshold ranges, wherein said processing data is analyzed by employing at least two different multi-variate predictive models of said set of multi-variate predictive models, wherein said processing data is analyzed by employing a first multi-variate predictive model to generate a first set of component wear data values and employing a second multi-variate predictive model to generate a second set of component wear data values, if differences exist between said first set of component wear data values and said second set of component wear data values, applying said second multi-variate predictive model to said first set of component wear data values, wherein said first set of component wear data values has less noise than said second set of component wear data values.

2. The method of claim 1 further including pulling data from a library to support said set of multi-variate predictive models.

3. The method of claim 2 wherein said recipe includes one of a client-specific recipe, a non-client specific recipe, and a waferless clean autoclean recipe.

~~4. The method of claim 2 wherein said processing data is analyzed by employing a first multi-variate predictive model of said set of multi-variate predictive model.~~

~~5. The method of claim 2 wherein said processing data is analyzed by employing at least two multi-variate predictive models of said set of multi-variate predictive model.~~

~~6. The method of claim 5 wherein processing data is analyzed by employing a first multi-variate predictive model to generate a first set of component wear data values and employing a second multi-variate predictive model to generate a second set of~~

~~component wear data values, if differences exist between said first set of component wear data values and said second set of component wear data values, applying said second multi-variate predictive model to said first set of component wear data values, wherein said first set of component wear data values has less noise than said second set of component wear data values.~~

74. The method of claim 2 wherein said set of multi-variate predictive models includes at least one of an electrical model, a statistical model, and a plasma model.

85. The method of claim 2 wherein said set of multi-variate predictive models is configured to analyze more than one consumable part, wherein each consumable part is associated with one useful life threshold range of said set of useful life threshold ranges.

96. The method of claim 2 wherein said set of useful life threshold ranges is user-configurable.

107. The method of claim 2 further including performing said assessing of said health status of said processing chamber after a measurement interval, wherein said measurement interval is determined by one of a predefined period of time and by executing a non-plasma test.

118. The method of claim 2 further including

analyzing said set of component wear data values to determine if validation is required, wherein said validation occurs when said set of component wear data values is outside of a noise level threshold range;

executing a non-plasma test to validate said set of component wear data values; and correlating said set of component wear data values against a set of non-plasma test data values to generate a combined set of component wear data values, wherein said combined set of component wear data values is compared against said set of useful life threshold ranges and said warning is generated if said combined set of component wear data values is outside of said set of useful life threshold ranges.

129. An article of manufacture comprising a program storage medium having computer readable code embodied therein, said computer readable code being configured for assessing health status of a processing chamber, comprising:

code for executing a recipe;

code for receiving processing data from a set of sensors during execution of said recipe; code for analyzing said processing data utilizing a set of multi-variate predictive models;

code for generating a set of component wear data values;
code for comparing said set of component wear data values against a set of useful life threshold ranges; and

code for generating a warning if said set of component wear data values is outside of said set of useful life threshold ranges, wherein said code for analyzing said processing data includes code for utilizing at least two different multi-variate predictive models of said set of multi-variate predictive models;

code for pulling data from a library to support said set of multi-variate predictive models;

code for analyzing said set of component wear data values to determine if validation is required, wherein validation occurs when said set of component wear data values is outside of a noise level threshold range;

code for executing a non-plasma test to validate said set of component wear data values; and

code for correlating said set of component wear data values against a set of non-plasma test data values to generate a combined set of component wear data values, wherein said combined set of component wear data values is compared against said set of useful life threshold ranges and said warning is generated if said combined set of component wear data values is outside of set of useful life threshold ranges.

~~13. — The article of manufacture of claim 12 further including code for pulling data from a library to support said set of multi-variate predictive models.~~

~~14~~10. The article of manufacture of claim ~~13~~9 further including code for performing said assessing of said health status of said processing chamber after a measurement interval, wherein said measurement interval is determined by one of a predefined period of time and by executing a non-plasma test.

~~15. — The article of manufacture of claim 13 further including~~

~~code for analyzing said set of component wear data values to determine if validation is required, wherein validation occurs when said set of component wear data values is outside of a noise level threshold range;~~

~~code for executing a non-plasma test to validate said set of component wear data values; and~~

~~code for correlating said set of component wear data values against a set of non-plasma test data values to generate a combined set of component wear data values;~~

~~wherein said combined set of component wear data values is compared against said set of useful life threshold range and said warning is generated if said combined set of component wear data values is outside of set of useful life threshold range.~~

~~1611.~~ The article of manufacture of claim ~~13~~ 9 wherein said recipe includes one of a client-specific recipe, a non-client specific recipe, and a waferless clean autoclean recipe.

~~17.~~ The article of manufacture of claim ~~13~~ wherein said code for analyzing said processing data includes code for utilizing a first multi-variate predictive model of said set of multivariate predictive model.

~~18.~~ The article of manufacture of claim ~~13~~ wherein said code for analyzing said processing data includes code for utilizing at least two multi-variate predictive models of said set of multi-variate predictive model.

~~1912.~~ The article of manufacture of claim ~~18~~ 9 wherein said code for analyzing said processing data includes code for utilizing a first multi-variate predictive model ~~to generate a first set of component wear data values and code for utilizing a second of said set of multi-variate predictive models to generate a second set of component wear data values, if differences exist between said first set of component wear data values and said second set of wear data values, code for applying said second multi-variate predictive model to said first set of component wear data values, wherein said second multi-variate predictive model has less noise than said first multi-variate predictive model.~~

~~2013.~~ The article of manufacture of claim ~~13~~ 9 wherein said set of multi-variate predictive models includes at least one of an electrical model, a statistical model, and a plasma model.

14. An article of manufacture comprising a program storage medium having computer readable code embodied therein, said computer readable code being configured for assessing health status of a processing chamber, comprising;

code for executing a recipe;

code for receiving processing data from a set of sensors during execution of said recipe;

code for analyzing said processing data utilizing a set of multi-variate predictive models;

code for generating a set of component wear data values; code for comparing said set of component wear data values against a set of useful life threshold ranges; code for generating a warning if said set of component wear data values is outside of said set of

useful life threshold ranges, wherein said code for analyzing said processing data includes code for utilizing at least two different multi-variate predictive models of said set of multi-variate predictive model, wherein said code for analyzing said processing data includes code for utilizing at least two multi-variate predictive models of said set of multi-variate predictive models, and

wherein code for analyzing said processing data includes code for utilizing a first multi-variate predictive model to generate a first set of component wear data values and code for utilizing a second multi-variate predictive model to generate a second set of component wear data values, if differences exist between said first set of component wear data values and said second set of wear data values, code for applying said second multi-variate predictive model to said first set of component wear data values, wherein said second multi-variate predictive model has less noise than said first multi-variate predictive model.

15. A method for assessing health status of a processing chamber, comprising: executing as recipe;

receiving processing data from a set of sensors during execution of said recipe;

analyzing said processing data utilizing a set of multi-variate predictive models;

generating a set of component wear data values;

comparing said set of component wear data values against a set of useful life threshold ranges;

generating a warning if said set of component wear data values is outside of said set of useful life threshold ranges, wherein said processing data is analyzed by employing at least two different multi-variate predictive models of said set of multi-variate predictive models;

pulling data from a library to support said set of multi-variate predictive models;

analyzing said set of component wear data values to determine if validation is required, wherein said validation occurs when said set of component wear data values is outside of a noise level threshold range;

executing a non-plasma test to validate said set of component wear data values;

and

correlating said set of component wear data values against a set of non-plasma test data values to generate a combined set of component wear data values, wherein said combined set of component wear data values is compared against said set of useful life

threshold ranges and said warning is generated if said combined set of component wear data values is outside of said set of useful life threshold ranges.

16. The method of claim 15 wherein said recipe includes one of a client-specific recipe, a non-client specific recipe, and a waferless clean autoclean recipe.

17. The method of claim 15 wherein said set of multi-variate predictive models includes at least one of an electrical model, a statistical model, and a plasma model.

18. The method of claim 15 wherein said set of multi-variate predictive models is configured to analyze more than one consumable part, wherein each consumable part is associated with one useful life threshold range of said set of useful life threshold ranges.