CLAIMS

1. A fluid filtration system comprising:

a workstation, the workstation comprising a cabinet;

a pump, the pump supported by the cabinet and adapted to selectively produce a flow of fluid;

a single use filter and a fluid supply conduit, the single use filter having an upstream end and a downstream end, the single use filter removably mounted to the workstation, the upstream end of the single use filter being in fluid communication with the pump via the fluid supply conduit, the fluid supply conduit comprising a test junction;

an integrity test device and a test conduit, the integrity test device supported by the cabinet and in fluid communication with the upstream end of the single use filter via the test conduit, the test conduit fluidly connected to the single use filter via the test junction of the fluid supply conduit, the integrity test device adapted to be connected to a source of pressurized gas and to selectively direct a flow of pressurized gas through the test conduit and the single use filter;

a control unit, the control unit comprising a processor and a non-transitory computer readable medium bearing an integrity test program, the processor arranged with the computer readable medium to execute the integrity test program, the processor being in electrical communication with the integrity test device to selectively operate the integrity test device to perform a test operation on the single use filter using the flow of pressurized gas based upon instructions from the integrity test program.

2. The fluid filtration system according to claim 1, wherein the fluid supply conduit comprises a fluid supply valve, the test conduit comprises a test conduit valve, and the integrity test program is configured to perform the following steps as part of the test operation when executed by the processor:

close the fluid supply valve to occlude the fluid supply conduit,

open the test conduit valve to open the test conduit,

operate the integrity test device to direct the flow of pressurized gas through the test conduit and through the single use filter.

3. The fluid filtration system according to claim 1 or claim 2, wherein the test conduit comprises an air filter disposed between the integrity test device and the single use filter.

4. The fluid filtration system according to any one of claim 1 to claim 3, wherein the test conduit comprises a liquid sensor disposed between the integrity test device and the test junction.

5. The fluid filtration system according to claim 1, wherein the test conduit comprises an air filter disposed between the integrity test device and the single use filter, a liquid sensor disposed between the air filter and the test junction, and a test conduit valve disposed between the air filter and the liquid sensor.

6. The fluid filtration system according to any one of claim 1 to claim 5, wherein the test conduit comprises a vent junction, the system further comprising:

a vent conduit, the vent conduit in fluid communication with the test conduit via the vent junction, the vent conduit comprising a vent valve;

wherein the integrity test program is configured to perform the following step as part of the test operation when executed by the processor:

close the vent valve to occlude the vent conduit.

7. The fluid filtration system according to any one of claim 1 to claim 6, further comprising:

a discharge conduit, the discharge conduit in fluid communication with the downstream end of the single use filter, the discharge conduit comprising a first outlet and a second outlet and a first outlet valve and a second outlet valve respectively associated with the first outlet and the second outlet, the first outlet adapted for fluid connection to a product container and the second outlet adapted for fluid connection to a waste repository;

wherein the integrity test program is configured to perform the following steps as part of the test operation when executed by the processor:

close the first outlet valve to occlude the first outlet,

open the second outlet valve to open the second outlet.

8. The fluid filtration system according to claim 7, wherein the discharge conduit comprises a pressure sensor configured to measure a pressure within the discharge conduit, the pressure sensor configured to generate a pressure signal indicative of the pressure measured within the discharge conduit, the processor in electrical communication with the pressure sensor to receive the pressure signal therefrom.

9. The fluid filtration system according to claim 8, wherein the integrity test device comprises a FIT pressure sensor, the FIT pressure sensor configured to generate a pressure signal indicative of the pressure measured within the test conduit upstream of the single use filter, the processor in electrical communication with the FIT pressure sensor to receive the pressure signal therefrom, and wherein the integrity test program is configured to perform the following steps as part of the test operation when executed by the processor:

receive the pressure signal from the FIT pressure sensor,

determine whether a test condition of the test operation is satisfied based upon the pressure signal.

10. The fluid filtration system according to any one of claim 1 to claim 9, further comprising:

a display device, the display device in operable arrangement with the processor;

wherein the integrity test program is configured to perform the following steps as part of the test operation when executed by the processor:

determine whether the single use filter satisfied the test operation,

generate a graphical display containing a graphical indication of whether the single use filter satisfied the test operation,

display the graphical display on the display device.

11. A method of conducting in-situ integrity testing of a single use filter, the method comprising:

removably mounting a single use filter to a workstation, the workstation comprising a cabinet;

fluidly connecting an upstream end of the single use filter to a pump via a fluid supply conduit and to an integrity test device via a test conduit, the fluid supply conduit comprising a test junction, the test conduit fluidly connected to the single use filter via the test junction of the fluid supply conduit, and the pump and the integrity test device supported by the cabinet;

fluidly connecting the integrity test device to a source of pressurized gas;

operating the integrity test device to direct a flow of pressurized gas through the test conduit to perform a test operation on the single use filter.

12. The method according to claim 11, wherein operating the integrity test device to perform the test operation comprises executing an integrity test program stored upon a non-transitory computer-readable medium using a processor.

13. The method according to claim 12, further comprising:

using the processor to:

determine whether the single use filter satisfied the test operation,

generate a graphical display containing a graphical indication of whether the single use filter satisfied the test operation,

display the graphical display on a display device.

14. The method according to any one of claim 11 to claim 13, wherein the test operation comprises one of a forward flow test, a water intrusion test, a bubble point test, a leak test, and a pressure decay test.

15. The method according to any one of claim 11 to claim 14, wherein the fluid supply conduit comprises a fluid supply valve, and the test conduit comprises a test conduit valve, the method further comprising:

closing the fluid supply valve to occlude the fluid supply conduit during the test operation;

opening the test conduit valve to open the test conduit during the test operation.

16. The method according to any one of claim 11 to claim 15, wherein the test conduit comprises a vent junction, the method further comprising:

closing a vent valve to occlude a vent conduit during the test operation, the vent conduit in fluid communication with the test conduit via the vent junction.

17. The method according to claim 16, further comprising:

opening the vent valve to open the vent conduit after completing the test operation to permit pressurized gas upstream of the single use filter to vent out of the test conduit into the vent conduit.

18. The method according to any one of claim 11 to claim 17, further comprising:

measuring a pressure within the test conduit upstream of the single use filter;

wherein operating the integrity test device to perform the test operation comprises determining whether a test condition of the test operation is satisfied based upon the pressure measured within the test conduit.

19. The method according to claim 18, wherein a discharge conduit is in fluid communication with a downstream end of the single use filter, the discharge conduit comprises a first outlet and a second outlet and a first outlet valve and a second outlet valve respectively associated with the first outlet and the second outlet, the method further comprising:

closing a first outlet valve to occlude the first outlet, the first outlet fluidly connected to a product container;

opening the second outlet valve to open the second outlet, the second outlet fluidly connected to a waste repository.

20. The method according to claim 18, wherein a discharge conduit is in fluid communication with a downstream end of the single use filter, the discharge conduit comprises a first outlet and a second outlet and a first outlet valve and a second outlet valve respectively associated with the first outlet and the second outlet, the method further comprising:

opening a first outlet valve to open the first outlet, the first outlet fluidly connected to a product container;

closing the second outlet valve to occlude the second outlet, the second outlet fluidly connected to a waste repository.