Claims

1. A valve checker system comprising:

a valve including:

a valve housing having an inlet side, an outlet side, and a valve element positioned therebetween, the valve element being selectively and repeatably rotatable between (i) a first closed position, wherein a seal is formed between the valve element and the valve housing, thereby substantially preventing fluid flow between the inlet side and the outlet side, and (ii) an open position, wherein the seal is broken such that fluid flow is permissible between the inlet side and the outlet side,

the valve element also being selectively and repeatably rotatable within a discrete angle in a direction toward the open position, from the first closed position into a second closed position in which the seal is maintained between the valve element and the valve housing; and

a controller operatively coupled to the valve element and configured to rotate the valve element between the first closed position and the second closed position.

2. The valve check system of claim 1, wherein the controller is configured to periodically rotate the valve element between the first closed position and the second closed position.

3. The valve checker system of claim 1 or claim 2, wherein a valve seat is mounted within the valve housing, and the valve element is a ball having a peripheral surface and a port extending through the ball, wherein the seal is formed between the peripheral surface of the ball and the valve seat such that the port is fluidly disconnected from the inlet side and the outlet side of the valve housing in both the first closed position and the second closed position, and the port is in fluid communication with the inlet side and the outside in the open position, such that fluid flow is permissible between the inlet side and the outlet side through the port.

4. The valve checker system of any one of the previous claims, wherein the discrete angle is between approximately 4 degrees and approximately 9 degrees.

5 The valve checker system of any one of claims 1, 2 or 4, wherein the valve is a butterfly valve, and the valve element is a disc.

6. The valve checker system of claim 5, wherein the disc is coated with a polymeric coating configured to form the seal between the disc and the valve housing.

7. The valve checker system of claim 6, wherein the polymeric coating comprises a nitrile rubber coating.

8. The valve checker system of any one of claims 5-7, wherein the disc is a double flanged disc, having upper end and lower end peripheral flanges forming the seal between the disc and the valve housing.

9. The valve checker system of any one of the preceding claims, further comprising a motor operatively coupled to the controller and to the valve element, the motor being configured to rotate the valve element.

10. The valve checker system of claim 9, further comprising a position sensor operatively coupled to the controller and the valve element, the position sensor being configured to detect position information of the valve element and transmit the position information to the controller, the controller being further configured to determine valve malfunction when power is supplied to the motor and the position information remains unchanged.

11. The valve checker system of claim 9 or claim 10, wherein the controller is further configured to determine valve malfunction when a current drawn by the motor exceeds a predetermined threshold current.

12. The valve checker system of any one of the preceding claims, further comprising a limit switch operatively coupled to the controller and the valve element, the limit switch configured to change states when the valve element is rotated from the first closed position, the controller

being further configured to determine valve malfunction when power is supplied to the motor with the valve element in the first closed position and the state of the limit switch remains unchanged.

13. The valve check system of claim 1, wherein the valve is a fire truck pumper valve.

14. A network of fire truck pumper valves comprising:

a plurality of the valve of any one of the preceding claims, the respective valve element of each valve being selectively and repeatably rotatable between the first closed position thereof and the second closed position,

wherein the controller is configured to rotate the respective valve element of each valve between the first closed position and the second closed position thereof.

15. A method of preventing valve stiction of the valve of any one of the preceding claims, the method comprising the steps of:

rotating the valve element of the valve from the first closed position thereof to the second closed position thereof; and

rotating the valve element from the second closed position thereof to the first closed position thereof.

16. The method of claim 15, further comprising the step of periodically repeating both rotating steps.

17. The method of claim 15 or claim 16, wherein a motor and a position sensor are each operatively coupled to the controller and to the valve element, the motor being configured to rotate the valve element, wherein each of the rotating steps comprises supplying power to the motor to rotate the valve element, and further comprising the steps of:

detecting position information of the valve element via the position sensor;

transmitting the position information to the controller; and

determining valve malfunction, via the controller, if the position information remains unchanged.

18. The method of claim 15 or claim 16, wherein a motor is operatively coupled to the controller and to the valve element, the motor being configured to rotate the valve, wherein each of the rotating steps comprises supplying power to the motor to rotate the valve element, and further comprising the step of:

determining valve malfunction, via the controller, if a current drawn by the motor exceeds a predetermined threshold current.

19. The method of claim 15 or claim 16, wherein a motor and a limit switch are each operatively coupled to the controller and to the valve element, the motor being configured to rotate the valve element and the limit switch being configured to change states when the valve element is rotated from the first closed position, wherein the step of rotating the valve element from the first closed position thereof to the second closed position thereof comprises supplying power to the motor to rotate the valve element, and further comprising the step of:

determining valve malfunction, via the controller, if the state of the limit switch remains unchanged.

20. A method of preventing valve stiction of a network of fire truck pumper valves comprising a plurality of the valve of any one of claims 1-13, the method comprising:

rotating the respective valve element of each valve from the first closed position thereof to the second closed position thereof; and

rotating the respective valve element of each valve from the second closed position thereof to the first closed position thereof.