

CLAIMS

What is claimed is:

1. A production sleeve assembly for use downhole comprising:
 - a fluid pathway configured to provide fluid communication between an exterior of a wellbore tubular and an interior of the wellbore tubular through a chamber;
 - a flow restriction disposed in the fluid pathway; and
 - a valve disposed in series with the flow restriction in the fluid pathway, wherein the valve comprises:
 - a rupture disk; and
 - a plug releasably engaged in the fluid pathway in series with the rupture disk, wherein the valve is configured to allow production from the exterior of the wellbore tubular to the interior of the wellbore tubular through the chamber without producing past the plug once the rupture disk is actuated.
2. The assembly of claim 1, wherein the flow restriction comprises at least one of an inflow control device or an autonomous inflow control device.
3. The assembly of claim 1 or 2, wherein the plug comprises a ball.
4. The assembly of any of claims 1 to 3, wherein the valve is configured to release the plug when the rupture disk is ruptured and the pressure within the exterior of the wellbore tubular is greater than the pressure within the interior of the wellbore tubular.
5. The assembly of any of claims 1 to 4, wherein the plug is configured to at least partially disintegrate or at least partially dissolve in response to a fluid flow through the chamber.
6. The assembly of any of claims 1 to 5, wherein the rupture disk comprises a frangible material.

7. The assembly of any of claims 1 to 6, further comprising a seat, wherein the plug sealingly engages the seat.
8. The assembly of claim 7, wherein the seat, the chamber, and the plug comprise a ball type check valve.
9. The assembly of claim 7 or 8, wherein the seat comprises a weep hole, and wherein the weep hole is configured to provide choked fluid communication past the plug.
10. The assembly of any of claims 7 to 9, wherein the seat comprises a portion of the flow restriction.
11. The assembly of any of claims 7 to 10, wherein the seat is configured to at least partially erode in response to a production flow from the exterior of the wellbore tubular into the interior of the wellbore tubular.
12. A production string for use downhole comprising:
 - a housing disposed about a wellbore tubular, wherein a chamber is formed between the housing and the wellbore tubular;
 - a flow restriction disposed in the chamber; and
 - a valve disposed in a fluid pathway between the chamber and an interior of the wellbore tubular, wherein the valve comprises:
 - a rupture disk; and
 - a plug disposed adjacent the rupture disk, wherein the valve is configured to substantially block fluid flow between the interior of the wellbore tubular and the chamber in a first state, substantially prevent fluid flow from the interior of the wellbore tubular into the chamber in a second state, and allow fluid flow between the chamber and the interior of the wellbore tubular in a third state.

13. The production string of claim 12, wherein the valve is configured to transition from the first state to the third state in response to a pressure increase in the interior of the wellbore tubular.
14. The production string of claim 12 or 13, wherein the valve is in series with the flow restriction.
15. The production string of claim 14, further comprising at least one one-way valve in series with the flow restriction, wherein the at least one one-way valve is configured to allow fluid flow from the exterior of the wellbore tubular to the interior of the wellbore tubular while substantially preventing flow from the interior of the wellbore tubular to the exterior of the wellbore tubular.
16. The production string of any of claims 12 or 13, further comprising at least one one-way valve in series with the flow restriction, wherein the one-way valve is configured to allow flow from the exterior of the wellbore tubular to the interior of the wellbore tubular while substantially preventing flow from the interior of the wellbore tubular to the exterior of the wellbore tubular, and wherein the valve is disposed in parallel with the flow restriction.
17. The production string of claim 16, wherein the valve is configured to provide a flow path bypassing the flow restriction when the valve is in the third state.
18. The production string of any of claims 12 to 17, further comprising a filter media, wherein a fluid pathway into the chamber passes through the filter media.
19. A method of changing the flow state of a production sleeve comprising:
pressurizing an interior of a wellbore tubular to a first pressure, wherein the first pressure is greater than a second pressure in an exterior of the wellbore tubular;

actuating a rupture disk in response to the first pressure, wherein the rupture disk is disposed in a fluid pathway between the exterior of a wellbore tubular and the interior of the wellbore tubular;

maintaining the first pressure within the interior of the wellbore tubular using a plug, wherein the plug is releasably engaged in the fluid pathway adjacent the rupture disk;

decreasing the pressure in the interior of the wellbore tubular below the second pressure; and

establishing fluid communication between the exterior of the wellbore tubular and the interior of the wellbore tubular along the fluid pathway in response to the decreasing of the pressure in the interior of the wellbore tubular.

20. The method of claim 19, wherein establishing fluid communication comprises establishing fluid communication through a flow restriction disposed in the fluid pathway.

21. The method of claim 19 or 20, further comprising:
maintaining the first pressure within the interior of the wellbore tubular using one or more one-way valves, wherein the one or more one-way valves are configured to allow fluid flow from the exterior of the wellbore tubular to the interior of the wellbore tubular while substantially blocking flow from the interior of the wellbore tubular to the exterior of the wellbore tubular; and
bypassing a flow restriction.

22. The method of any of claims 19 to 21, further comprising:
actuating a second rupture disk in response to the first pressure, wherein the second rupture disk is disposed in a second fluid pathway between the exterior of the wellbore tubular and the interior of the wellbore tubular; and

establishing fluid communication between the exterior of the wellbore tubular and the interior of the wellbore tubular along the second fluid pathway in response to the decreasing of the pressure in the interior of the wellbore tubular.

23. The method of any of claims 19 to 21, further comprising:
actuating a second rupture disk in response to the first pressure, wherein the second rupture disk is disposed in the fluid.
24. The method of any of claims 19 to 23, wherein the plug is releasably engaged with a seat in the fluid pathway.
25. The method of claim 24, further comprising:
flowing a fluid from the exterior of the wellbore tubular to the interior of the wellbore tubular along the fluid pathway; and
eroding at least a portion of the seat in response to the fluid flowing through the fluid pathway.
26. The method of claim 24 or 25, wherein the seat comprises a portion of a flow restriction.
27. The method of any of claims 19 to 24, further comprising:
flowing a fluid from the exterior of the wellbore tubular to the interior of the wellbore tubular along the fluid pathway; and
eroding at least a portion of the plug in response to the fluid flowing through the fluid pathway.
28. The method of any of claims 19 to 27, further comprising: removing substantially the entire rupture disk from the fluid pathway in response to actuating the rupture disk.

CLAIMS

What is claimed is:

1. A production sleeve assembly for use downhole comprising:
 - a fluid pathway configured to provide fluid communication between an exterior of a wellbore tubular and an interior of the wellbore tubular through a chamber;
 - a flow restriction disposed in the fluid pathway parallel to the axis of the wellbore tubular; and
 - a valve disposed in series with the flow restriction in the fluid pathway, wherein the valve comprises:
 - a rupture disk; and
 - a plug releasably engaged in the fluid pathway in series with the rupture disk, wherein the valve is configured to allow production from the exterior of the wellbore tubular to the interior of the wellbore tubular through the chamber and past the plug once the rupture disk is actuated; wherein the valve comprises a flowpath that is perpendicular to the axis of the wellbore tubular, wherein the rupture disk initially traps the plug in the valve.
2. The assembly of claim 1, wherein the flow restriction comprises an autonomous inflow control device.
3. The assembly of claim 1, wherein the plug comprises a ball.
4. The assembly of claim 1, wherein the valve is configured to release the plug when the rupture disk is ruptured and the pressure within the exterior of the wellbore tubular is greater than the pressure within the interior of the wellbore tubular.
5. The assembly of claim 1, wherein the plug is configured to at least partially disintegrate or at least partially dissolve in response to a fluid flow through the chamber.
6. The assembly of claim 1, wherein the rupture disk comprises a frangible

material.

7. The assembly of claim 1, further comprising a seat, wherein the plug sealingly engages the seat.

8. The assembly of claim 7, wherein the seat, the chamber, and the plug comprise a ball type check valve.

9. The assembly of claim 7, wherein the seat comprises a weep hole, and wherein the weep hole is configured to provide choked fluid communication past the plug.

10. The assembly of claim 7, wherein the seat creates a restriction to flow in addition to that created by the flow restriction.

11. The assembly of claim 7, wherein the seat is configured to at least partially erode in response to a production flow from the exterior of the wellbore tubular into the interior of the wellbore tubular.

12. A method of changing the flow state of a production sleeve comprising:

pressurizing an interior of a wellbore tubular to a first pressure, wherein the first pressure is greater than a second pressure in an exterior of the wellbore tubular;

actuating a rupture disk in response to the first pressure, wherein the rupture disk is disposed in a fluid pathway between the exterior of the wellbore tubular and the interior of the wellbore tubular;

maintaining the first pressure within the interior of the wellbore tubular using a plug, wherein the plug is releasably engaged in the fluid pathway adjacent the rupture disk;

decreasing the pressure in the interior of the wellbore tubular below the second pressure; and

establishing fluid communication between the exterior of the wellbore tubular and the interior of the wellbore tubular along the fluid pathway through a first flow restriction in the fluid pathway in response to the decreasing of the pressure in the

interior of the wellbore tubular, wherein the first flow restriction is parallel to the axis of the wellbore tubular, wherein the plug and the rupture disk form a valve with a flowpath that is perpendicular to the axis of the wellbore tubular, and wherein the rupture disk initially traps the plug in the valve and prevents flow across the valve, and wherein the valve becomes a one-way valve after actuating the rupture disk.

13. The method of claim 12, further comprising:

maintaining the first pressure within the interior of the wellbore tubular using the one-way valve, wherein the one-way valve is configured to allow fluid flow from the exterior of the wellbore tubular to the interior of the wellbore tubular while substantially blocking flow from the interior of the wellbore tubular to the exterior of the wellbore tubular; and

bypassing a second flow restriction in the fluid pathway downstream of the one-way valve.

14. The method of claim 12, further comprising:

actuating a second rupture disk in response to the first pressure, wherein the second rupture disk is disposed in a second fluid pathway between the exterior of the wellbore tubular and the interior of the wellbore tubular; and

establishing fluid communication between the exterior of the wellbore tubular and the interior of the wellbore tubular along the second fluid pathway in response to the decreasing of the pressure in the interior of the wellbore tubular.

15. The method of claim 12, wherein the plug is releasably engaged with a seat in the flowpath of the valve.

16. The method of claim 15, further comprising:

flowing a fluid from the exterior of the wellbore tubular to the interior of the wellbore tubular along the fluid pathway; and

eroding at least a portion of the seat in response to the fluid flowing through the fluid pathway.

17. The method of claim 15, wherein the seat creates a restriction to flow in addition to that created by the first flow restriction.

18. The method of claim 12, further comprising:

flowing a fluid from the exterior of the wellbore tubular to the interior of the wellbore tubular along the fluid pathway; and

eroding at least a portion of the plug in response to the fluid flowing through the fluid pathway.

19. The method of claim 12, further comprising:

removing substantially the entire rupture disk from the fluid pathway in response to actuating the rupture disk.