

CLAIMS

1. A vacuum system non-return valve comprising:
 - a baffle for extending across a flow path in said vacuum system, said baffle
 - 5 comprising an aperture, a perimeter of said aperture comprising a valve seat;
 - a valve member comprising a protrusion extending from a surface configured to mate with said valve seat, said protrusion extending through said aperture; wherein
 - said protrusion comprises a retaining portion extending outwardly from said
 - 10 protrusion and configured such that said retaining portion cannot pass through said aperture;
 - said valve member and aperture being configured such that said valve member obscures said aperture and seals with said valve seat to impede a flow of fluid from an outlet end to an inlet end in a closed position and is displaceable
 - 15 in use to move away from said valve seat and allow a fluid flow from said inlet end to said outlet end in an open position;
 - said retaining portion being configured to limit the travel of the valve member towards said outlet end when said valve is in said open position.
- 20 2. A vacuum system non-return valve according to claim 1, said baffle comprising an outer perimeter configured to seal with said vacuum system.
3. A vacuum system non-return valve according to claim 1 and further comprising:
 - 25 an outer envelope configured to sealingly mate with said vacuum system, said outer envelope being formed as a single piece and comprising an inlet end and an outlet end, said inlet and outlet ends being in fluid communication via said aperture, said aperture defining a through passage through said valve.
- 30 4. A vacuum system non-return valve according to claim 3, wherein said outer envelope comprises an annular wall connecting said inlet and outlet ends.

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5. A vacuum system non-return valve according to claim 4, wherein said outer envelope comprises a substantially cylindrical shape
6. A vacuum system non-return valve according to claim 4, wherein said outer envelope has a cross section that increases towards a central portion.
7. A vacuum system non-return valve according to any preceding claim, wherein said valve seat comprises an elastomeric material.
8. A vacuum system non-return valve according to any preceding claim, wherein said surface from which said protrusion extends comprises a curved surface.
9. A vacuum system non-return valve according to any one of claims 1 to 6, wherein said valve member comprises a curved sealing surface configured to mate with said valve seat; and
at least a portion of said surface of said baffle surrounding said aperture is sloped towards said inlet end of said valve such that said aperture is larger towards said outlet end than towards said inlet
10. A vacuum system non-return valve according to claim 9, wherein diametrically opposing portions of said sloped surfaces subtend an angle of between 45° and 100° , preferably between 55° and 70° .
11. A vacuum system non-return valve according to claim 9 or 10, wherein said sloped portion of said surface surrounding said aperture extends from a surface facing said outlet end of said valve towards said surface facing said inlet end and becomes steeper for a portion extending to said surface facing said inlet end, said valve seat being at a location at or close to a change in said angle of slope.

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12. A vacuum system non-return valve according to claim 9, wherein said sloped surface comprises a curved profile configured to substantially match a curved profile of said valve member.

5 13. A vacuum system non-return valve according to claim 9, wherein said surface of said baffle surrounding said aperture comprises an indent such that said valve member is configured to contact said surface surrounding said aperture at two places at either end of said indent.

10 14. A vacuum system non-return valve apparatus comprising two vacuum, system non-return valves according to any preceding claim, arranged in series with respect to each other, such that fluid from an inlet end of said valve apparatus flows through a first of said non-return valves and then through a second of said non-return valves.

15 15. A vacuum system non-return valve apparatus according to claim 14, further comprising an intermediate volume providing a flow path between said valve seats of said two valves, said flow path having a length of between 1.5 and 10 times a length of a diameter of said valve seats.

20 16. A vacuum system non-return valve apparatus according to claim 14 or 15, said intermediate volume being within a pipe connecting said first and second intermediate valves.

25 17. A vacuum system non-return valve apparatus according to claim 14 or 15, comprising a combined outer housing for housing both said first and second check valves.

30 18. A vacuum system non-return valve apparatus according to claim 17, wherein said combined outer housing is configured such that a flow path between said check valves comprises a portion running in an opposite direction to a flow path in and out of said valve apparatus.

19. A vacuum system non-return valve comprising:

a baffle for extending across a flow path in said vacuum system, said baffle comprising an aperture, a perimeter of said aperture comprising a valve seat;

5 a valve member comprising a curved sealing surface configured to mate with said valve seat, said valve member and aperture being configured such that said valve member obscures said aperture and seals with said valve seat to impede a flow of fluid from an outlet end to an inlet end in a closed position and is displaceable in use to move away from said valve seat and allow a fluid flow from
10 said inlet end to said outlet end in an open position;

at least a portion of said surface of said baffle surrounding said aperture slopes inwardly towards said inlet end of said valve such that said aperture is smaller at said inlet end than it is at said outlet end.