Claims

1. A ball valve comprising:

   a valve housing;

   a first seat surface having a first inner diameter and a first outer diameter;

   a second seat surface having a second inner diameter and a second outer diameter, the second inner diameter being larger than the first outer diameter, wherein the first seat surface and the second seat surface are fixed relative to each other;

   a resilient seat surface disposed within a channel between the first valve seat surface and the second valve seat surface; and

   a ball rotatably movable within the housing and contacting and at least one of the first seat surface and the second seat surface to form a seal within the ball valve;

   wherein pressure acting in a first direction and in a second direction opposite the first direction increases the contact pressure of the first seat surface, resilient seat surface, and the second seat surface with the ball.

2. The ball valve of claim 1, wherein the resilient material is overmolded within the channel, and machined to form a common seat surface with the first seat surface and second seat surface.

3. The ball valve of claim 1 or 2, wherein the resilient material is overmolded within the channel, and machined to a height that is offset from the first seat surface and second seat surface when the resilient material is in an uncompressed state.

4. The ball valve of any of the preceding claims, wherein the resilient material comprises PEEK.

5. The ball valve of any of the preceding claims, wherein the first seat surface comprises a resilient material.

6. The ball valve of any of the preceding claims, further comprising a first seating member, wherein the first seating member comprises the first seat surface, and wherein the first seating member overlies an intermediate resilient member.

7. A method of forming a ball valve, the method comprising:

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providing a valve housing, the valve housing having a channel between a first valve seat surface and a second valve seat surface, the first valve seat surface having a first inner diameter and a first outer diameter and the second seat surface having a second inner diameter and a second outer diameter, the second inner diameter being larger than the first outer diameter; and

providing a ball within the housing and contacting and at least one of the first seat surface and the second seat surface to form a seal within the ball valve.

8. The method of claim 7, further comprising providing a resilient material within the channel, and optionally, wherein the resilient material comprises PEEK.

9. The method of claim 8, wherein providing the resilient material comprises overmolding the resilient material within the channel, and machining the resilient material to form a common seat surface with the first seat surface and second seat surface and optionally, wherein providing the resilient material comprises overmolding the resilient material within the channel, and machining the resilient material to form a seat surface that is offset from the first seat surface and second seat surface when the resilient material is in an uncompressed state.

10. The method of any of claims 7-9, wherein the first seat surface comprises a resilient material, and optionally, wherein the resilient material comprises PEEK.

11. The method of any of claims 7-10, wherein providing the first seat surface comprises providing a first seating member, wherein the first seating member comprises the first seat surface, and wherein the first seating member overlies an intermediate resilient member.

12. A ball valve comprising:

a valve housing;

a first seat surface having a first inner diameter and a first outer diameter, wherein the first seat surface comprises a resilient material;

a second seat surface having a second inner diameter and a second outer diameter, the second inner diameter being larger than the first outer diameter, wherein the first seat surface and the second seat surface are fixed relative to each other;

a channel between the first valve seat surface and the second valve seat surface; and

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a ball rotatably movable within the housing and contacting and at least one of the first seat surface and the second seat surface to form a seal within the ball valve;

wherein pressure acting in a first direction and in a second direction opposite the first direction increases the contact pressure of the first seat surface and the second seat surface with the ball.

13. The ball valve of claim 12, further comprising a second resilient material disposed within the channel, wherein the ball contacts the second resilient material when in a closed position, and optionally, wherein the second resilient material is overmolded within the channel, and machined to form a common seat surface with the first seat surface and second seat surface, and optionally, wherein the resilient material is overmolded within the channel, and machined to a height that is offset from the first seat surface and second seat surface when the resilient material is in an uncompressed state.

14. The ball valve of claim 12 or 13, wherein the resilient material comprises PEEK.

15. The ball valve of any of claims 12-14, further comprising a first seating member, wherein the first seating member comprises the first seat surface, and wherein the first seating member overlies an intermediate resilient member.

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