CLAIMS

1. A method manufacturing a gate valve having a body with a chamber and a flow passage having an axis and extending through and intersecting the chamber, the method comprising:

   (a) providing a gate and two annular seats, each of the gate and the annular seats being formed of a corrosion resistant steel alloy;

   (b) bonding a ceramic and/or hardfacing alloy matrix composite plate to the bodies of each of the annular seats and/or to opposite sides of the body of the gate;

   (c) applying a tungsten carbide coating to each of the plates;

   (d) locating the annular seats at intersections of the flow passage and the chamber; and

   (e) locating the gate in the cavity so that the gate slidingly engages the seats while being moved between open and closed positions.

2. The method according to claim 1, wherein the ceramic and/or hardfacing alloy matrix composite plates comprise tungsten carbide.

3. The method according to claim 2, wherein the ceramic and/or hardfacing alloy matrix composite plate comprise a cobalt matrix for the tungsten carbide.

4. The method according to claim 1, wherein the ceramic and/or hardfacing alloy matrix plates have a modulus of elasticity of at least 48,000 ksi.

5. The method according to claim 1, wherein the ceramic and/or hardfacing alloy matrix composite plates have a thickness of ⅛ to ½ inches.

6. The method according to claim 1, wherein step (b) comprises welding the ceramic and/or hardfacing alloy matrix composite plates onto the bodies of the annular seats and/or to the body of the gate.

7. The method of claim 1, further comprising depositing low-friction coating on each of the tungsten carbide coatings.

8. The method according to claim 7, wherein the low-friction coatings comprise diamond-like carbon coatings.

9. An apparatus for controlling well fluids comprising:

a gate valve having a body with a cavity;

a passage through the body and intersecting the cavity and that is for handling a flow of a wellbore fluid;

a pair of annular seats, each of the annular seats circumscribing the passage and provided where the passage intersects the cavity, each of the annular seats having a body formed of a corrosion resistant steel alloy;

a tungsten carbide seat plate bonded to the body of each of the annular seats;

a tungsten carbide coating applied to each of the seat plates;

a diamond-like carbon coating applied to the tungsten carbide coating on each of the seat plates;

a gate in the cavity selectively movable in sliding engagement with the gate between an open and a closed position, the gate having a body formed of a corrosion resistant steel alloy;

a tungsten carbide gate plate bonded to opposite sides of the body of the gate;

a tungsten carbide coating applied to each of the gate plates; and

a diamond-like carbon coating applied to the tungsten carbide coating on each of the gate plates.

10. An apparatus for controlling well fluids comprising:

a gate valve having a body with a cavity;

a passage through the body and intersecting the cavity and that is for handling a flow of a wellbore fluid;

a pair of annular seats, each of the annular seats circumscribing the passage and provided where the passage intersects the cavity, each of the annular seats having a body formed of a corrosion resistant steel alloy;

a ceramic and/or hardfacing alloy matrix composite seat plate bonded to the body of each of the annular seats;

a tungsten carbide coating applied to each of the seat plates; a gate in the cavity selectively movable between an open and a closed position in sliding engagement with the annular seats, the gate having a body formed of a corrosion resistant steel alloy;

a ceramic and/or hardfacing alloy matrix composite gate plate bonded to opposite sides of the body of the gate; and

a tungsten carbide coating applied to each of the gate plates.

11. The apparatus according to claim 10, further comprising a low-friction coating deposited atop the tungsten carbide coating on each of the seat plates and each of the gate plates.

12. The apparatus according to claim 11, wherein the low-friction coating comprises a diamond-like carbon.