CLAIMS

What is claimed is:

1. A subsurface safety valve assembly, comprising:

a valve housing comprising a valve seat comprising a circumference and a seat seal surface;

a flapper rotatably connected to the valve housing and comprising a flapper seal surface, wherein the flapper is rotatable into sealing engagement with the seat seal surface in a closed position to form a circumferential surface-to-surface seal;

a dovetail groove cut into the seat seal surface or the flapper seal surface; and

a seal ring held within the dovetail groove and positioned to form a seal against the seal ring when the flapper is in the closed position;

wherein the seat seal surface, the flapper seal surface, the dovetail groove, and the seal ring are shaped such that the load on the seal ring is uniform around the seal ring when the flapper is in the closed position; and

wherein the dovetail groove is cut into a cross section of the seal seat surface or the flapper seal surface projected by an ellipse to create the uniform loading around the seal ring.

2. The assembly of claim 1, wherein loading on the flapper seal surface when in the closed position is controlled at least in part by at least one of width, radial distance of a minor diameter, or radial distance of a major diameter of the dovetail groove.

3. The assembly of claim 1, wherein the seat seal surface is spherical.

4. The assembly of claim 1, wherein the seat seal surface and the flapper seal surface are metal and a metal-to-metal seal is formed when the flapper is in the closed position.

5. The assembly of claim 1, wherein the load on the surface-to-surface seal is uniform around the circumference of the seat seal surface.

6. The assembly of claim 1, wherein the seat seal surface is elliptical.

7. The assembly of claim 1, wherein the seat seal surface is not uniform around the circumference of the seat seal surface and the seal against the seal ring is uniform in cross section around the circumference of the seat seal surface.

8. The assembly of claim 1, wherein the dovetail groove is located in the flapper seal surface.

9. The assembly of claim 1, wherein the dovetail groove is located in the seat seal surface.

10. The assembly of claim 1, wherein the dovetail groove is shaped in a flat plane.

11. The assembly of claim 1, wherein the dovetail groove enhances the effectiveness of the surface-to-surface seal.

12. The assembly of claim 1, wherein the seat seal surface and flapper seal surface are non-uniform in cross section.

13. The assembly of claim 1, wherein the subsurface safety valve is integrated within a production tubing system.

14. The assembly of claim 1, further comprising a tubular movable to rotate the flapper into the closed position.

15. A method of using a subsurface safety valve integrated with a production tubing system:

rotating flapper to a closed position and into engagement with a valve seat so as to form a circumferential surface-to-surface seal between a flapper seal surface and a seat seal surface as well as a seal against a seal ring held within a dovetail groove cut into the circumference of the flapper seal surface or the seat seal surface; and

wherein the seat seal surface, the flapper seal surface, the dovetail groove, and the seal ring are shaped such that the load on the seal ring is uniform around the seal ring when the flapper is in the closed position; and

wherein the dovetail groove is cut into a cross section of the seal seat surface or the flapper seal surface projected by an ellipse to create the uniform loading around the seal ring.

16. The method of claim 15 wherein the seat seal surface and the flapper seal surface are metal and further comprising forming a metal-to-metal seal when the flapper is rotated to the closed position.

17. The method of claim 15 further comprising wherein the load on the surface-to-surface seal is uniform around the circumference of the seat seal surface.

18. The method of claim 15, wherein the seat seal surface is not uniform around the circumference of the seat seal surface and the seal against the seal ring is uniform in cross section around the circumference of the seat seal surface.

19. The method of claim 15, wherein the seat seal surface and flapper seal surface are non-uniform in cross section.

20. The method of claim 15, further comprising producing formation fluids through the subsurface safety valve when the flapper is in an open position.