CLAIMS

What is claimed is:

1. A seal mechanism for use with a downhole component comprising:

a first tubular member and a second tubular member, wherein the first tubular member is disposed within the second tubular member and separated therefrom by an extrusion gap;

a circumferential groove disposed on the first tubular member;

a seal disposed within the circumferential groove, wherein the seal is selectively positionable into engagement with the second tubular member; and

a high pressure seal back-up disposed within the circumferential groove, wherein the distance between an inside diameter of the high pressure seal back-up and an outside diameter of the high pressure seal back-up is configured to remain substantially constant when pressure increases on the high pressure seal back-up, and wherein the high pressure seal back-up is configured to have an increase in its outer diameter in response to a pressure increase.

2. The seal mechanism of claim 1, wherein a plurality of locking teeth are disposed on a surface of the high pressure seal back-up and are configured to engage with a plurality of locking teeth are disposed on a surface adjacent to the high pressure seal back-up.

3. The seal mechanism of claim 1, wherein a wedge is fixedly attached to a surface adjacent to the high pressure seal back-up.

4. The seal mechanism of claim 1, wherein the high pressure seal back-up comprises at least one material selected from the group consisting of: a fluoropolymer, a polyethylene polymer, a silicon polymer, a urethane polymer, a metal, and any combination thereof.

5. The seal mechanism of claim 1, wherein the high pressure seal back-up is a wave spring.

6. The seal mechanism of claim 1, wherein the high pressure seal mechanism comprises a one-way seal.

7. The seal mechanism of claim 1, wherein the high pressure seal back-up is configured to engage the second tubular member in response to a pressure increase on the high pressure seal back-up.

8. The seal mechanism of claim 1, wherein a plurality of the high pressure seal back-ups are disposed within the circumferential groove, wherein the distance between an inside diameter

of each of the high pressure seal back-up and an outside diameter of each of the high pressure seal back-up is configured to remain substantially constant when pressure increases on each of the high pressure seal back-up.

9. The seal mechanism of claim 1, wherein a plurality of second seal back-ups are disposed within the circumferential groove.

10. A seal mechanism configured for a downhole component comprising:

a tubular member disposed adjacent to a surface;

a circumferential groove disposed on the tubular member;

a seal disposed within the circumferential groove, wherein the seal is configured to engage with the surface; and

a high pressure seal back-up disposed within the circumferential groove, wherein the high pressure seal back-up is configured to extend into an extrusion gap in response to an axial compression.

11. The seal mechanism of claim 10, wherein the tubular member and the surface are configured so that the tubular member may move axially along the surface.

12. The seal mechanism of claim 10, wherein the high pressure seal back-up is configured to prevent the seal from extruding through the extrusion gap.

13. The seal mechanism of claim 10, wherein the high pressure seal back-up is configured so that the distance between an inside diameter of the high pressure seal back-up and an outside diameter of the high pressure seal back-up remain substantially constant when pressure increases on the high pressure seal back-up.

14. The seal mechanism of claim 10, wherein a second seal back-up disposed within the circumferential groove is configured to engage with the high pressure seal back-up.

15. A method comprising:

increasing pressure on a seal and a high pressure seal back-up, wherein the seal and the high pressure seal back-up are disposed at least partially within a circumferential groove, wherein the high pressure seal back-up comprises a wave spring;

radially extending the high pressure seal back-up; and

engaging the seal with a tubular member and a surface to form a sealing engagement between the tubular member and the surface.

16. The method of claim 15, further comprising decreasing pressure on the seal and the high pressure seal back-up, wherein the high pressure seal back-up radially contracts away from the surface while maintaining a substantially constant distance between an outside diameter of the high pressure seal back-up and an inside diameter of the high pressure seal back-up.

17. The method of claim 15, further comprising engaging a wedge fixedly attached to a second surface adjacent to the high pressure seal back-up.

18. The method of claim 17, further comprising decreasing pressure on the seal and the high pressure seal back-up, wherein the wedge slows the reduction of the outside diameter of the high pressure seal back-up when pressure decreases on the high pressure seal back-up.

19. The method of claim 15, further comprising engaging a plurality of locking teeth disposed on a surface of the high pressure seal back-up with a plurality of locking teeth disposed on a second surface adjacent to the high pressure seal.

20. The method of claim 19, further comprising decreasing pressure on the seal and the high pressure seal back-up, wherein the plurality of locking teeth disposed on the high pressure seal back-up and engaged with the plurality of locking teeth disposed on the second surface slows the reduction of the outside diameter of the high pressure seal back-up when pressure decreases on the high pressure seal back-up.

CLAIMS

What is claimed is:

1. A seal mechanism for use with a downhole component comprising:

a first tubular member and a second tubular member, wherein the first tubular member is disposed within the second tubular member and separated therefrom by an extrusion gap;

a circumferential groove disposed on the first tubular member;

a seal disposed within the circumferential groove, wherein the seal is selectively positionable into engagement with the second tubular member; and

a high pressure seal back-up disposed within the circumferential groove, wherein the distance between an inside diameter of the high pressure seal back-up and an outside diameter of the high pressure seal back-up is configured to remain substantially constant when pressure increases on the high pressure seal back-up, and wherein the high pressure seal back-up is configured to have an increase in its outer diameter in response to a pressure increase;

wherein a plurality of locking teeth are disposed on a surface of the high pressure seal back-up and are configured to engage with the plurality of locking teeth disposed on a surface adjacent to the high pressure seal back-up.

2. The seal mechanism of claim 1, wherein a wedge is fixedly attached to a surface adjacent to the high pressure seal back-up.

3. The seal mechanism of claim 1, wherein the high pressure seal back-up comprises at least one material selected from the group consisting of: a fluoropolymer, a polyethylene polymer, a silicon polymer, a urethane polymer, a metal, and any combination thereof.

4. The seal mechanism of claim 1, wherein the high pressure seal back-up is a wave spring.

5. The seal mechanism of claim 1, wherein the high pressure seal mechanism comprises a oneway seal.

6. The seal mechanism of claim 1, wherein the high pressure seal back-up is configured to engage the second tubular member in response to a pressure increase on the high pressure seal back-up.

7. The seal mechanism of claim 1, wherein a plurality of the high pressure seal back-ups are disposed within the circumferential groove, wherein the distance between an inside diameter of each of the high pressure seal back-up and an outside diameter of each of the high pressure seal back-up is configured to remain substantially constant when pressure increases on each of the high pressure seal back-up.

8. The seal mechanism of claim 1, wherein a plurality of second seal back-ups are disposed within the circumferential groove.

9. A seal mechanism configured for a downhole component comprising:

a tubular member disposed adjacent to a surface;

a circumferential groove disposed on the tubular member;

a seal disposed within the circumferential groove, wherein the seal is configured to engage with the surface; and

a high pressure seal back-up disposed within the circumferential groove, wherein the high pressure seal back-up is configured to extend into an extrusion gap in response to an axial compression, resulting from the application of a pressure differential across the seal mechanism;

wherein the high pressure seal back-up has a plurality of locking teeth disposed thereon which engage with the plurality of locking teeth on an adjacent surface to the high pressure seal back-up to prevent the high pressure seal back-up from radially contracting until the pressure differential falls below a threshold.

10. The seal mechanism of claim 9, wherein the tubular member and the surface are configured so that the tubular member may move axially along the surface.

11. The seal mechanism of claim 9, wherein the high pressure seal back-up is configured to prevent the seal from extruding through the extrusion gap.

12. The seal mechanism of claim 9, wherein the high pressure seal back-up is configured so that the distance between an inside diameter of the high pressure seal back-up and an outside diameter of the high pressure seal back-up remain substantially constant when pressure increases on the high pressure seal back-up.

13. The seal mechanism of claim 9, wherein a second seal back-up disposed within the circumferential groove is configured to engage with the high pressure seal back-up.

14. A method comprising:

increasing pressure on a seal and a high pressure seal back-up, wherein the seal and the high pressure seal back-up are disposed at least partially within a circumferential groove, wherein the high pressure seal back-up comprises a wave spring;

radially extending the high pressure seal back-up; and

engaging the seal with a tubular member and a surface to form a sealing engagement between the tubular member and the surface;

wherein the method further comprising engaging a plurality of locking teeth disposed on a surface of the high pressure seal back-up with a plurality of locking teeth disposed on a second surface adjacent to the high pressure seal back-up.

15. The method of claim 14, further comprising decreasing pressure on the seal and the high pressure seal back-up, wherein the high pressure seal back-up radially contracts away from the surface while maintaining a substantially constant distance between an outside diameter of the high pressure seal back-up and an inside diameter of the high pressure seal back-up.

16. The method of claim 14, further comprising engaging a wedge fixedly attached to a second surface adjacent to the high pressure seal back-up.

17. The method of claim 16, further comprising decreasing pressure on the seal and the high pressure seal back-up, wherein the wedge slows the reduction of the outside diameter of the high pressure seal back-up when pressure decreases on the high pressure seal back-up.

18. The method of claim 14, further comprising decreasing pressure on the seal and the high pressure seal back-up, wherein the plurality of locking teeth disposed on the high pressure seal back-up and engaged with the plurality of locking teeth disposed on the second surface slows the reduction of the outside diameter of the high pressure seal back-up when pressure decreases on the high pressure seal back-up.