CLAIMS

We claim:

1. A sealing assembly for a high temperature applications, comprising:

an outer ring having an interior surface having two inwardly extending projections defining a seal receiving area;

an inner ring having an exterior surface having two outwardly extending projections defining a seal receiving area;

a center sealing ring comprising an elastomer and configured to be positioned within the seal receiving areas of the outer ring and the inner ring, wherein when the sealing assembly is installed in a high temperature application at a service temperature of about 100ºC to about 300ºC, the center sealing ring is enclosed within the outer and the inner rings so as to protect the center sealing ring while allowing for thermal expansion of the center sealing ring, wherein (i) the seal receiving area of the outer ring has a longitudinal cross-sectional profile of an inwardly facing truncated V and each inwardly facing projection of the outer ring is angled away from a transverse central axis through the outer ring and from each other, and each forms an angle of about 5° to about 25° with the transverse central axis of the outer ring and/or (ii) the seal receiving area of the inner ring has a longitudinal cross-sectional profile of an outwardly facing truncated V and each outwardly extending projection of the inner ring is angled away from a transverse central axis through the inner ring and from each other, and each forms an angle of about 5° to about 25° with the transverse central axis of the inner ring.

2. The sealing assembly according to claim 1, wherein the high temperature application is a vacuum sealing assembly for use in semiconductor manufacturing.

3. The sealing assembly according to claim 1, wherein the high temperature application includes a service temperature of about 180°C to about 300°C.

4. The sealing assembly according to claim 1, wherein the elastomer is a fluoroelastomer or a perfluoroelastomer.

5. The sealing assembly according to claim 1, wherein the seal receiving area of the outer ring has a longitudinal cross-sectional profile of an inwardly facing truncated V.

6. The sealing assembly according to claim 5, wherein the inwardly extending projections of the outer ring are each spaced from each other and are each spaced from a longitudinal center of the interior surface of the outer ring by a distance of about 50% to about 60% of a height of the interior surface of the outer ring.

7. A sealing assembly for a high temperature application, comprising

an outer ring having an interior surface having two inwardly extending projections defining a seal receiving area;

an inner ring having an exterior surface having two outwardly extending projections defining a seal receiving area;

a center sealing ring comprising an elastomer and configured to be positioned within the seal receiving areas of the outer ring and the inner ring, wherein when the sealing assembly is installed in a high temperature application including a service temperature of about 100°C to about 300 °C, the center sealing ring is enclosed within the outer and inner rings so as to protect the center sealing ring while allowing for thermal expansion of the center sealing ring, wherein the seal receiving area of the outer ring has a longitudinal cross-sectional profile of an inwardly facing truncated V and,

wherein each inwardly extending projection of the outer ring is angled away from a transverse central axis through the outer ring and from each other, and each forms an angle of about 5° to about 25° with the transverse central axis of the outer ring.

8. The sealing assembly according to claim 7, wherein each inwardly extending projection of the outer ring forms an angle of about 10° to about 20° with the transverse central axis of the outer ring.

9. The sealing assembly according to claim 1, wherein the seal receiving area of the inner ring has a longitudinal cross-sectional profile of an outwardly facing truncated V.

10. The sealing assembly according to claim 9, wherein the outwardly extending projections of the inner ring are each spaced from each other and are each spaced from a longitudinal center of the exterior surface of the inner ring by a distance of about 43% to about 53% of a height of the exterior surface of the inner ring.

11. A sealing assembly for high temperature application, comprising:

an outer ring having an interior surface having two inwardly extending projections defining a seal receiving area;

an inner ring having an exterior surface having two outwardly extending projections defining a seal receiving area;

a center sealing ring comprising an elastomer and configured to be positioned within the seal receiving areas of the outer ring and the inner ring, wherein when the sealing assembly is installed in a high temperature application including a service temperature of about 100°C to about 300°C, the center sealing ring is enclosed within the outer and inner rings so as to protect the center sealing ring while allowing for thermal expansion of the center sealing ring, wherein the seal receiving area of the inner ring has a longitudinal cross-sectional profile of an outwardly facing truncated V and,

wherein each outwardly extending projection of the inner ring is angled away from a transverse central axis through the inner ring and from each other, and each forms an angle of about 5° to about 25° with the transverse central axis of the inner ring.

12. The sealing assembly according to claim 11, wherein each outwardly extending projection of the inner ring forms an angle of about 10° to about 20° with the transverse central axis of the inner ring.

13. The sealing assembly according to claim 1, wherein the seal receiving area of the outer ring has a longitudinal cross-sectional profile of an inwardly facing truncated V and the seal receiving area of the inner ring has a longitudinal cross-sectional profile of an outwardly facing truncated V.

14. The sealing assembly according to claim 13, wherein the inwardly extending projections of the outer ring are each spaced from each other and are each spaced from a longitudinal center of the interior surface of the outer ring by a distance of about 50% to about 60% of a height of the interior surface of the outer ring, and wherein the outwardly extending projections of the inner ring are each spaced from each other and are each spaced from a longitudinal center of the exterior surface of the inner ring by a distance of about 43% to about 53% of a height of the exterior surface of the inner ring.

15. A sealing assembly for a high temperature application, comprising:

an outer ring having an interior surface having two inwardly extending projections defining a seal receiving area;

an inner ring having an exterior surface having two outwardly extending projections defining a seal receiving area;

a center sealing ring comprising an elastomer and configured to be positioned within the seal receiving areas of the outer ring and the inner ring, wherein when the sealing assembly is installed in a high temperature application including a service temperature of about 100°C to about 300°C, the center sealing ring is enclosed within the outer and inner rings so as to protect the center sealing ring while allowing for thermal expansion of the center sealing ring, wherein the seal receiving area of the outer ring has a longitudinal cross-sectional profile of an inwardly facing truncated V and the seal receiving area of the inner ring has a longitudinal profile of an outwardly facing truncated V and,

wherein each inwardly extending projection of the outer ring is angled away from a transverse central axis through the outer ring and from each other, and each forms an angle of about 5° to about 25° with the transverse central axis of the outer ring, and wherein each outwardly extending projection of the inner ring is angled away from a transverse central axis through the inner ring and from each other, and each forms an angle of about 5° to about 25° with the transverse central axis of the inner ring.

16. The sealing assembly according to claim 1, wherein the center sealing ring has a longitudinal cross-section that has a side-ways barrel shape.

17. The sealing assembly according to claim 1, wherein the center sealing ring has a longitudinal cross-section that has a truncated side-ways tear drop shape with an inner facing side that is flat and an outer facing side that is curved, wherein the inner facing side is smaller than the outer facing side.

18. The sealing assembly according to claim 1, wherein the center sealing ring has a longitudinal cross-section that has a truncated side-ways tear drop shape with an inner facing side that is curved and an outer facing side that is curved, and wherein the inner facing side is smaller than the outer facing side.

19. The sealing assembly according to claim 1, wherein the center sealing ring has a longitudinal cross-section that has a truncated side-ways tear drop shape with an inner facing side that is flat and an outer facing side that is flat, and wherein the inner facing side is smaller than the outer facing side.

20. A sealing assembly for a high temperature application, comprising:

an outer ring having an interior surface having two inwardly extending projections defining a seal receiving area;

an inner ring having an exterior surface having an outwardly extending rectangular portion on a central portion of the exterior surface of the inner ring and a further rounded projection extending outwardly from the rectangular portion;

a center sealing ring comprising an elastomer having a longitudinal cross-section that is inwardly facing and generally C-shaped to define an inner ring receiving area, wherein the center sealing ring is configured to be positioned within the seal receiving area of the outer ring and to receive the outwardly extending rounded projection of the inner ring within the inner ring receiving area, and wherein when the sealing assembly is installed in a high temperature application, the center sealing ring is enclosed within the outer ring and compressed against the inner ring so as to protect the center sealing ring while allowing for thermal expansion of the center sealing ring.

21. The sealing assembly according to claim 20, wherein the seal receiving area of the outer ring has a longitudinal cross-sectional profile of an inwardly facing truncated V.

22. The sealing assembly according to claim 21, wherein the inwardly facing projections of the outer ring are each spaced from each other and are each spaced from a longitudinal center of the interior surface of the outer ring by a distance of about 50% to about 60% of a height of the interior surface of the outer ring.

23. The sealing assembly according to claim 21, wherein each inwardly facing projection of the outer ring is angled away from a transverse central axis through the outer ring and from each other, and each forms an angle of about 5° to about 25° with the transverse central axis of the outer ring.

24. The sealing assembly according to claim 23, wherein the inwardly facing projections of the outer ring each form an angle of about 10° to about 20° with the transverse central axis of the outer ring.

25. The sealing assembly of claim 20, wherein the outer ring and the inner ring comprise a metal, a metal alloy or a fluoropolymer.

26. The sealing assembly of claim 25, wherein the outer ring and/or the inner ring comprises a metal or metal alloy selected from the group consisting of aluminum 6061, aluminum 7075, stainless steel 316, and stainless steel 304.

27. The sealing assembly according to claim 25, wherein the outer ring and/or the inner ring comprises a fluoropolymer that is selected from polytetrafluoroethylene, a copolymer of

perfluoroalkylvinyl ether and tetrafluoroethylene, and a copolymer of hexafluoropropylene and tetrafluoroethylene.

28. The sealing assembly of claim 20, wherein the center sealing ring comprises a fluoroelastomer or a perfluoroelastomer.

29. A bonded sealing assembly for a high temperature application, comprising:

a sealing ring body having a longitudinal cross-section that has an outer ring portion, an inner ring portion and a central transversely extending bridge extending between the outer and the inner ring portions, wherein the outer ring portion has an inwardly extending rectangular portion and the inner ring portion has an inwardly extending rectangular portion, each of the rectangular portions of the inner ring portion and the outer ring portions being positioned so as to be longitudinally centered with respect to a central transverse axis through the sealing ring body, wherein the bridge has an upper surface and a lower surface, and wherein the outer and inner ring portions together with and the bridge define upper and lower seal receiving areas; and

an upper seal lobe portion and a lower seal lobe portion, each bonded respectively to the upper surface and the lower surface of the bridge and each respectively located within the seal receiving areas of the sealing ring body, wherein the upper and the lower seal lobe portions have respectively an upwardly extending and a downwardly extending generally parabolic longitudinal cross-section, and wherein the upper and lower seal lobe portions define troughs in the respective seal receiving areas that allow for expansion of each of the upper seal lobe portion and the lower seal lobe portion.

30. The bonded sealing assembly according to claim 29, wherein the sealing ring body comprises a metal, a metal alloy and/or a fluoropolymer; the upper and lower seal lobe portions comprise an elastomer; and the sealing ring body and the seal lobe portions are chemically bonded.

31. The bonded sealing assembly according to claim 30, wherein the sealing ring body is a metal or metal alloy selected from the group consisting of aluminum 6061, aluminum 7075, stainless steel 316, and stainless steel 304.

32. The bonded sealing assembly according to claim 30, wherein the sealing ring body is a fluoropolymer selected from polytetrafluoroethylene, a copolymer of perfluoroalkylvinyl ether and tetrafluoroethylene, and a copolymer of hexafluoropropylene and tetrafluoroethylene.

33. The bonded sealing assembly according to claim 30, wherein the elastomer is a perfluoroelastomer or a fluoroelastomer.

34. The bonded sealing assembly according to claim 29, wherein the sealing ring body and the seal lobe portions are mechanically bonded.

35. The bonded sealing assembly for high temperature application according to claim 29, wherein the troughs in the respective seal receiving areas allow for expansion of each of the upper seal lobe portion and the lower seal lobe portion when the sealing assembly is installed in a high temperature application including a service temperature of about 100°C to about 300°C.