CLAIMS

What is claimed is:

1. An isolation gasket for use between facing flanges of two flow conduit sections for fluid passage therethrough, the isolation gasket comprising:

a flat metal core ring having an upper face opposing a lower face and an opening formed therein to allow fluid passage therethrough, the flat metal core ring having a serrated ring positioned between an inner ring and an outer ring, the serrated ring having a plurality of serrations along the upper face and the lower face;

a first non-conductive layer on the upper face and the lower face of the inner ring to provide a dieletric barrier for the inner ring;

a non-conductive coating on the plurality of serrations along the upper face and the lower face of the serrated ring to provide a dielectric barrier for the serrated ring;

a second non-conductive layer on the upper face and the lower face of the outer ring to provide a dielectric barrier for the outer ring;

a fire resistant layer on the non-conductive coating that is positioned on the serrated ring, wherein the fire resistant layer spans from an outer edge of the serrated ring to a mid-region of the serrated ring; and

a third non-conductive layer on the non-conductive coating that is positioned on the serrated ring, wherein the third non-conductive layer spans from an inner edge of the serrated ring to the mid-region of the serrated ring, wherein the fire resistant layer abuts against the third non-conductive layer.

2. The isolation gasket of claim 1, wherein the non-conductive coating is made of polytetrafluoroethylene.

3. The isolation gasket of any preceding claim, wherein the fire resistant layer is made of mica or aluminosilicate.

4. The isolation gasket of any preceding claim, wherein the third non-conductive layer is made of biaxially-oriented filled polytetrafluoroethylene.

5. The isolation gasket of any preceding claim, wherein the fire resistant layer abuts against the third non-conductive layer at a mid-point between the inner edge and the outer edge of the serrated ring.

6. The isolation gasket of claims 1 to 5, wherein the plurality of serrations have a corresponding plurality of alternating peaks and grooves, wherein each of the peaks has a first axial width dimension and each of the grooves has a second axial width dimension, the first axial width dimension being substantially the same for each of the peaks, and the second axial width dimension being substantially the same for each of the grooves.

7. The isolation gasket of claims 1 to 5, wherein the plurality of serrations have a corresponding plurality of alternating peaks and grooves, wherein each of the peaks has a first axial width dimension that is substantially the same for each of the peaks, and wherein the plurality of grooves includes five groups that are orderly arranged across a width of the serrated ring, wherein the outer two groups of the plurality of grooves have a second axial width dimension, the middle two groups of the plurality of grooves have a third axial width dimension, and the center group of the plurality of grooves has a fourth axial dimension, wherein the fourth axial width dimension is larger than the third axial width dimension, and the third axial width dimension is larger than the second axial width dimension.

8. The isolation gasket of claim 7, wherein the fourth axial width dimension, the third axial width dimension, and the second axial width dimension generally form a convex profile that spans across the width of the serrated ring.

9. In combination:

a pair of joined flow conduit sections which are constructed and arranged with facing flanges, each flow conduit section having a through bore; and

an isolation gasket for use between said facing flanges, the isolation gasket comprising:

a flat metal core ring having an upper face opposing a lower face and an opening formed therein to allow fluid passage therethrough, the flat metal core ring having a serrated ring positioned between an inner ring and an outer ring, the serrated ring having a plurality of serrations along the upper face and the lower face;

a first non-conductive layer on the upper and the lower faces of the inner ring to provide a dieletric barrier;

a non-conductive coating on the upper and the lower faces of the serrated ring;

a second non-conductive layer on the upper and the lower faces of the outer ring to provide a dielectric barrier;

a fire resistant layer on the non-conductive coating that is positioned on the serrated ring; and

a third non-conductive layer on the non-conductive coating that is positioned on the serrated ring, wherein the third non-conductive layer is adjacent the fire resistant layer.

10. The isolation gasket of any preceding claim, wherein the fire resistant layer spans from an outside diameter of the serrated ring to a middle diameter of the serrated ring, and wherein the third non-conductive layer spans from the middle diameter to an inside diameter of the serrated ring.

11. The isolation gasket of any preceding claim, further comprising:

at least one isolating sleeve positioned in an aligned bore formed in each of the facing flanges, the isolating sleeve having a length that is substantially equal to a distance between an outer face of each of the flanges with the isolation gasket positioned between the facing flanges;

at least one elongate metal fastener having opposing ends, the fastener received in the isolating sleeve for connecting the flanges to one another with the isolation gasket interposed therebetween; and

an isolating washer positioned on each of the at least one elongate metal fastener abutting the outer face of the flange.

12. The isolation gasket of claim 11, wherein the isolating washer includes a metal washer having opposing side surfaces with a sheet of dielectric material laminated to one of the opposing side surfaces and wherein the dielectric material abuts at least the outer face of the flange.

13. The isolation gasket of claim 11, wherein the isolating washer includes a metal core coated with a dielectric material.

14. The isolation gasket of claim 11, wherein the isolating sleeve includes a sleeve made of one of glass reinforced polymer material, epoxy material, phenolic material, and meta-aramid material.

15. The isolation gasket of claim 11, wherein the metal fastener includes a metal shaft threaded to receive a nut on at least one of the opposing ends.

16. The isolation gasket of any of claims 1 to 5 or claims 9 to 15, wherein the plurality of serrations have a corresponding plurality of alternating peaks and grooves, wherein each of the peaks has a first axial width dimension and each of the grooves has a second axial width dimension, the first axial width dimension being substantially the same for each of the peaks, and the second axial width dimension being substantially the same for each of the grooves.

17. The isolation gasket of any of claims 1 to 5 or claims 9 to 15, wherein the plurality of serrations have a corresponding plurality of alternating peaks and grooves, wherein each of the peaks has a first axial width dimension that is substantially the same for each of the peaks, and wherein the plurality of grooves includes five groups that are orderly arranged across a width of the serrated ring, wherein the outer two groups of the plurality of grooves have a second axial width dimension, the middle two groups of the plurality of grooves have a third axial

width dimension, and the center group of the plurality of grooves has a fourth axial dimension, wherein the fourth axial width dimension is larger than the third axial width dimension, and the third axial width dimension is larger than the second axial width dimension.

18. The isolation gasket of claim 17, wherein the fourth axial width dimension, the third axial width dimension, and the second axial width dimension generally form a convex profile that spans across the width of the serrated ring.

19. An isolation gasket for use between facing flanges of two flow conduit sections for fluid passage therethrough, the isolation gasket comprising:

a flat metal core ring having an upper face opposing a lower face and an opening formed therein to allow fluid passage therethrough, the flat metal core ring having a serrated ring positioned between an inner ring and an outer ring, the serrated ring having a plurality of serrations along the upper face and the lower face;

a first non-conductive layer on the upper face and the lower face of the inner ring to provide a dielectric barrier for the inner ring;

a second non-conductive layer on the upper face and the lower face of the outer ring to provide a dielectric barrier for the outer ring;

a non-conductive coating applied on the plurality of serrations of the upper face and the lower face of the serrated ring to provide a dielectric barrier for the serrated ring;

a fire resistant layer and a third non-conductive layer arranged in a side by side orientation on the non-conductive coating applied on the plurality of serrations of the serrated ring, wherein each of the fire resistant layer and the third non-conductive layer covers approximately half of the serrated ring.

20. The isolation gasket of any preceding claim, wherein the fire resistant layer spans from an outer edge of the serrated ring to a mid-region of the serrated ring, and the third non-conductive layer spans from an inner edge of the serrated ring to

the mid-region of the serrated ring such that the fire resistant layer and the third non-conductive layer do not overlap.

21. The isolation gasket of any preceding claim, wherein the non-conductive coating is made of polytetrafluoroethylene.

22. The isolation gasket of any preceding claim, wherein the fire resistant layer is made of mica or aluminosilicate.

23. The isolation gasket of any preceding claim, wherein the third non-conductive layer is made of biaxially-oriented filled polytetrafluoroethylene.

24. The isolation gasket of any of claims 1 to 5, 9 to 15, and 19 to 23, wherein the plurality of serrations have a corresponding plurality of alternating peaks and grooves, wherein each of the peaks has a first axial width dimension and each of the grooves has a second axial width dimension, the first axial width dimension being substantially the same for each of the peaks, and the second axial width dimension being substantially the same for each of the grooves.

25. The isolation gasket of any of claims 1 to 5, 9 to 15, and 19 to 23, wherein the plurality of serrations have a corresponding plurality of alternating peaks and grooves, wherein each of the peaks has a first axial width dimension that is substantially the same for each of the peaks, and wherein the plurality of grooves includes five groups that are orderly arranged across a width of the serrated ring, wherein the outer two groups of the plurality of grooves have a second axial width dimension, the middle two groups of the plurality of grooves have a third axial width dimension, and the center group of the plurality of grooves has a fourth axial dimension, wherein the fourth axial width dimension is larger than the third axial width dimension, and the third axial width dimension is larger than the second axial width dimension.

26. The isolation gasket of claim 25, wherein the fourth axial width dimension, the third axial width dimension, and the second axial width dimension generally form a convex profile that spans across the width of the serrated ring.

CLAIMS

What is claimed is:

1. An isolation gasket for use between facing flanges of two flow conduit sections for fluid passage therethrough, the isolation gasket comprising:

a flat metal core ring having an upper face opposing a lower face and an opening formed therein to allow fluid passage therethrough, the flat metal core ring having a serrated ring positioned between an inner ring and an outer ring, the serrated ring having a plurality of serrations along the upper face and the lower face, the plurality of serrations include a plurality of alternating peaks and grooves, wherein each of the peaks has an axial width dimension that is substantially the same for each of the peaks, and wherein each of the plurality of grooves has an axial width dimension arranged such that collectively the plurality of grooves forms a convex profile that spans across a width of the serrated ring;

a first non-conductive layer on the upper and the lower faces of the inner ring to provide a dieletric barrier;

a non-conductive coating on the upper and the lower faces of the serrated ring;

a second non-conductive layer on the upper and the lower faces of the outer ring to provide a dielectric barrier;

a fire resistant layer on the non-conductive coating that is positioned on the serrated ring; and

a third non-conductive layer on the non-conductive coating that is positioned on the serrated ring, wherein the third non-conductive layer is adjacent the fire resistant layer.

2. The isolation gasket of any preceding claim, wherein the fire resistant layer abuts against the third non-conductive layer at a mid-point between the inner edge and the outer edge of the serrated ring.

3. The isolation gasket of any preceding claim, wherein the fire resistant layer spans from an outside diameter of the serrated ring to a middle diameter of the serrated

ring, and wherein the third non-conductive layer spans from the middle diameter to an inside diameter of the serrated ring.

4. The isolation gasket of any preceding claim, wherein the fire resistant layer and the third non-conductive layer are arranged in a side by side orientation on the non-conductive coating applied on the plurality of serrations of the serrated ring, wherein each of the fire resistant layer and the third non-conductive layer covers approximately half of the serrated ring.

5. The isolation gasket of any preceding claim, wherein the plurality of grooves includes five groups that are orderly arranged across a width of the serrated ring, wherein the outer two groups of the plurality of grooves have a second axial width dimension, the middle two groups of the plurality of grooves have a third axial width dimension, and the center group of the plurality of grooves has a fourth axial dimension, wherein the fourth axial width dimension is larger than the third axial width dimension, and the third axial width dimension is larger than the second axial width dimension.

6. The isolation gasket of claim 5, wherein the fourth axial width dimension, the third axial width dimension, and the second axial width dimension generally form a convex profile that spans across the width of the serrated ring.

7. In combination:

a pair of joined flow conduit sections which are constructed and arranged with facing flanges, each flow conduit section having a through bore; and

an isolation gasket for use between said facing flanges, the isolation gasket comprising:

a flat metal core ring having an upper face opposing a lower face and an opening formed therein to allow fluid passage therethrough, the flat metal core ring having a serrated ring positioned between an inner ring and an outer ring, the serrated ring having a plurality of serrations along the upper face and the lower face, the plurality of serrations include a plurality of alternating peaks and grooves, wherein each of the peaks has an axial width dimension that is substantially the same for each of the peaks,

and wherein each of the plurality of grooves has an axial width dimension arranged such that collectively the plurality of grooves forms a convex profile that spans across a width of the serrated ring;

a first non-conductive layer on the upper and the lower faces of the inner ring to provide a dieletric barrier;

a non-conductive coating on the upper and the lower faces of the serrated ring;

a second non-conductive layer on the upper and the lower faces of the outer ring to provide a dielectric barrier;

a fire resistant layer on the non-conductive coating that is positioned on the serrated ring; and

a third non-conductive layer on the non-conductive coating that is positioned on the serrated ring, wherein the third non-conductive layer is adjacent the fire resistant layer.

8. The isolation gasket of any preceding claim, wherein the fire resistant layer spans from an outside diameter of the serrated ring to a middle diameter of the serrated ring, and wherein the third non-conductive layer spans from the middle diameter to an inside diameter of the serrated ring.

9. The isolation gasket of any preceding claim, further comprising:

at least one isolating sleeve positioned in an aligned bore formed in each of the facing flanges, the isolating sleeve having a length that is substantially equal to a distance between an outer face of each of the flanges with the isolation gasket positioned between the facing flanges;

at least one elongate metal fastener having opposing ends, the fastener received in the isolating sleeve for connecting the flanges to one another with the isolation gasket interposed therebetween; and

an isolating washer positioned on each of the at least one elongate metal fastener abutting the outer face of the flange.

10. The isolation gasket of claim 9, wherein the isolating washer includes a metal washer having opposing side surfaces with a sheet of dielectric material laminated to

one of the opposing side surfaces and wherein the dielectric material abuts at least the outer face of the flange.

11. The isolation gasket of any one of claims 9 to 10, wherein the isolating washer includes a metal core coated with a dielectric material.

12. The isolation gasket of any one of claims 9 to 11, wherein the isolating sleeve includes a sleeve made of one of glass reinforced polymer material, epoxy material, phenolic material, and meta-aramid material.

13. The isolation gasket of any one of claims 9 to 12, wherein the metal fastener includes a metal shaft threaded to receive a nut on at least one of the opposing ends.

14. The isolation gasket of any one of claims 7 to 13, wherein the plurality of grooves includes five groups that are orderly arranged across a width of the serrated ring, wherein the outer two groups of the plurality of grooves have a second axial width dimension, the middle two groups of the plurality of grooves have a third axial width dimension, and the center group of the plurality of grooves has a fourth axial dimension, wherein the fourth axial width dimension is larger than the third axial width dimension, and the third axial width dimension is larger than the second axial width dimension.

15. The isolation gasket of claim 14, wherein the fourth axial width dimension, the third axial width dimension, and the second axial width dimension generally form a convex profile that spans across the width of the serrated ring.

16. An isolation gasket for use between facing flanges of two flow conduit sections for fluid passage therethrough, the isolation gasket comprising:

a flat metal core ring having an upper face opposing a lower face and an opening formed therein to allow fluid passage therethrough, the flat metal core ring having a serrated ring positioned between an inner ring and an outer ring, the serrated ring having a plurality of serrations along the upper face and the lower face, wherein the plurality of serrations have a corresponding plurality of alternating peaks and grooves, wherein each

of the peaks has a first axial width dimension that is substantially the same for each of the peaks, and wherein the plurality of grooves includes five groups that are orderly arranged across a width of the serrated ring, wherein the outer two groups of the plurality of grooves have a second axial width dimension, the middle two groups of the plurality of grooves have a third axial width dimension, and the center group of the plurality of grooves has a fourth axial dimension, wherein the fourth axial width dimension is larger than the third axial width dimension, and the third axial width dimension is larger than the second axial width dimension;

a first non-conductive layer on the upper face and the lower face of the inner ring to provide a dieletric barrier for the inner ring;

a second non-conductive layer on the upper face and the lower face of the outer ring to provide a dielectric barrier for the outer ring;

a non-conductive coating applied on the plurality of serrations of the upper face and the lower face of the serrated ring to provide a dielectric barrier for the serrated ring;

a fire resistant layer and a third non-conductive layer arranged in a side by side orientation on the non-conductive coating applied on the plurality of serrations of the serrated ring, wherein each of the fire resistant layer and the third non-conductive layer covers approximately half of the serrated ring.

17. The isolation gasket of any preceding claim, wherein the fire resistant layer spans from an outer edge of the serrated ring to a mid-region of the serrated ring, and the third non-conductive layer spans from an inner edge of the serrated ring to the mid-region of the serrated ring such that the fire resistant layer and the third non-conductive layer do not overlap.

18. The isolation gasket of any preceding claim, wherein the non-conductive coating is made of polytetrafluoroethylene.

19. The isolation gasket of any preceding claim, wherein the fire resistant layer is made of mica or aluminosilicate.

20. The isolation gasket of any preceding claim, wherein the third non-conductive layer is made of biaxially-oriented filled polytetrafluoroethylene.

21. The isolation gasket of any one of claims 16 to 20, wherein the fourth axial width dimension, the third axial width dimension, and the second axial width dimension generally form a convex profile that spans across the width of the serrated ring.