CLAIMS

What is claimed is:

1. An endplate of a hot isostatic pressing canister, the endplate comprising:
a central region; and
a main region extending radially from the central region and terminating in a corner about a periphery of the endplate, the corner including a peripheral lip configured to mate with a body portion of the canister;
wherein a thickness of the endplate increases from the central region to the corner and defines a taper angle; and
wherein an inner surface of the corner includes a radiused portion by which the main region smoothly transitions into the peripheral lip.

2. The endplate of claim 1, further comprising:
a substantially planar outer face; and
an inner face, wherein the taper angle is defined by an increasing distance between the outer face and the inner face in the main region as a distance from the central region increases.

3. The endplate of claim 2, wherein the peripheral lip comprises a chamfer configured to accept a weld bead for welding the endplate to a body portion of a hot isostatic pressing canister.

4. The endplate of claim 2, further comprising at least one fill stem, wherein the at least one fill stem is configured to enable fluid communication with an interior volume of a hot isostatic pressing canister when the endplate is secured to a body portion of the hot isostatic pressing canister.

5. The endplate of claim 4, wherein the endplate includes only a single fill stem.

6. The endplate of claim 2, wherein the endplate comprises at least one of a low carbon steel, a mild steel, and a stainless steel.

7. The endplate of claim 2, wherein at least a portion of the endplate comprises an electropolished finish.

8. The endplate of claim 2, wherein the endplate is configured to be secured to a cylindrical body portion of a hot isostatic pressing canister.

9. A canister for hot isostatic pressing a powdered material, the canister comprising:

a cylindrical body portion including a circular first end and a circular second end;

a first endplate welded to the circular first end of the cylindrical body portion, the first endplate comprising

a central region, and

a main region extending radially from the central region and terminating in a corner about a periphery of the endplate, the corner including a peripheral lip configured to mate with the body portion,

wherein a thickness of the endplate increases from the central region to the corner and defines a taper angle, and

wherein an inner surface of the corner includes a radiused portion by which the main region smoothly transitions into the peripheral lip; and

a second endplate welded to the circular second end of the cylindrical body portion.

10. The canister for hot isostatic pressing a powdered material of claim 9, wherein the first endplate further comprises:

a substantially planar outer face; and

an inner face, wherein the taper angle is defined by an increasing distance between the outer face and the inner face in the main region as a distance from the central region increases.

11. The canister for hot isostatic pressing a powdered material of claim 9, wherein the peripheral lip of the first endplate further comprises a chamfer configured to accept a weld bead for welding the first endplate to the circular first end of the cylindrical body portion of the canister.

12. The canister for hot isostatic pressing a powdered material of claim 9, wherein the first endplate further comprises at least one fill stem, wherein the at least one fill stem is configured to enable fluid communication with an interior volume of the canister when the first endplate is welded to the circular first end of the cylindrical body portion of the canister.

13. The canister for hot isostatic pressing a powdered material of claim 12, wherein the first endplate includes only a single fill stem.

14. The canister for hot isostatic pressing a powdered material of claim 9, wherein the first endplate comprises at least one of a low carbon steel, mild steel, and a stainless steel.

15. The canister for hot isostatic pressing a powdered material of claim 9, wherein at least a portion of the first endplate comprises an electropolished finish.

16. The canister for hot isostatic pressing a powdered material of claim 9, wherein the second endplate comprises:

a central region; and

a main region extending radially from the central region and terminating in a corner about a periphery of the endplate, the corner including a peripheral lip configured to mate with a body portion of the canister;

wherein a thickness of the endplate increases from the central region to the corner and defines a taper angle; and

wherein an inner surface of the corner includes a radiused portion by which the main region smoothly transitions into the peripheral lip.

17. A method for hot isostatic pressing a powdered material, the method comprising:

providing a canister for hot isostatic pressing, the canister comprising

a cylindrical body portion including a circular first end and a circular second end,

a first endplate welded to the circular first end of the cylindrical body portion, the first endplate comprising

a central region, and

a main region extending radially from the central region and terminating in a corner about a periphery of the endplate, the corner including a peripheral lip configured to mate with a body portion of the canister,

wherein a thickness of the endplate increases from the central region to the corner and defines a taper angle, and

wherein an inner surface of the corner includes a radiused portion by which the main region smoothly transitions into the peripheral lip,

a fill stem attached to the first endplate, wherein the fill stem provides fluid communication with an interior volume of the canister, and

a second endplate welded to the circular second end of the cylindrical body portion;

disposing at least one metallurgical powder in the canister through the fill stem;

evacuating air from the canister through the fill stem;

crimping the fill stem to hermetically seal the canister; and

hot isostatically pressing the canister to provide a hot isostatic pressed billet.

18. The method of claim 17, wherein the first endplate of the canister further comprises:

a substantially planar outer face; and

an inner face, wherein the taper angle is defined by an increasing distance between the outer face and the inner face in the main region as a distance from the central region increases.

20. The method of claim 17, wherein the metallurgical powder is a nickel-base superalloy powder.

21. The method of claim 17, wherein the metallurgical powder is one of a Rolls Royce RR1000 alloy powder, an Alloy 10 alloy powder, and a low carbon ASTROLOY alloy powder.

CLAIMS

What is claimed is:

1. An endplate of a hot isostatic pressing canister, the endplate comprising:
a central region; and
a main region extending radially from the central region and terminating in a corner about a periphery of the endplate, the corner including a peripheral lip configured to mate with a body portion of the canister;
wherein a thickness of the endplate increases from the central region to the corner and defines a taper angle; and
wherein an inner surface of the corner includes a radiused portion by which the main region smoothly transitions into the peripheral lip.

2. The endplate of claim 1, further comprising:
a substantially planar outer face; and
an inner face, wherein the taper angle is defined by an increasing distance between the outer face and the inner face in the main region as a distance from the central region increases.

3. The endplate of claim 2, wherein the peripheral lip comprises a chamfer configured to accept a weld bead for welding the endplate to a body portion of a hot isostatic pressing canister.

4. The endplate of claim 2, further comprising at least one fill stem, wherein the at least one fill stem is configured to enable fluid communication with an interior volume of a hot isostatic pressing canister when the endplate is secured to a body portion of the hot isostatic pressing canister.

5. The endplate of claim 4, wherein the endplate includes only a single fill stem.

6. The endplate of claim 2, wherein the endplate comprises at least one of a low carbon steel, a mild steel, and a stainless steel.

7. The endplate of claim 2, wherein at least a portion of the endplate comprises an electropolished finish.

8. The endplate of claim 2, wherein the endplate is configured to be secured to a cylindrical body portion of a hot isostatic pressing canister.

9. A canister for hot isostatic pressing a powdered material, the canister comprising:

a cylindrical body portion including a circular first end and a circular second end;

a first endplate welded to the circular first end of the cylindrical body portion, the first endplate comprising

a central region, and

a main region extending radially from the central region and terminating in a corner about a periphery of the endplate, the corner including a peripheral lip configured to mate with the body portion,

wherein a thickness of the endplate increases from the central region to the corner and defines a taper angle, and

wherein an inner surface of the corner includes a radiused portion by which the main region smoothly transitions into the peripheral lip; and

a second endplate welded to the circular second end of the cylindrical body portion.

10. The canister for hot isostatic pressing a powdered material of claim 9, wherein the first endplate further comprises:

a substantially planar outer face; and

an inner face, wherein the taper angle is defined by an increasing distance between the outer face and the inner face in the main region as a distance from the central region increases.

11. The canister for hot isostatic pressing a powdered material of claim 9, wherein the peripheral lip of the first endplate further comprises a chamfer configured to accept a weld bead for welding the first endplate to the circular first end of the cylindrical body portion of the canister.

12. The canister for hot isostatic pressing a powdered material of claim 9, wherein the first endplate further comprises at least one fill stem, wherein the at least one fill stem is configured to enable fluid communication with an interior volume of the canister when the first endplate is welded to the circular first end of the cylindrical body portion of the canister.

13. The canister for hot isostatic pressing a powdered material of claim 12, wherein the first endplate includes only a single fill stem.

14. The canister for hot isostatic pressing a powdered material of claim 9, wherein the first endplate comprises at least one of a low carbon steel, mild steel, and a stainless steel.

15. The canister for hot isostatic pressing a powdered material of claim 9, wherein at least a portion of the first endplate comprises an electropolished finish.

16. The canister for hot isostatic pressing a powdered material of claim 9, wherein the second endplate comprises:

a central region; and

a main region extending radially from the central region and terminating in a corner about a periphery of the endplate, the corner including a peripheral lip configured to mate with a body portion of the canister;

wherein a thickness of the endplate increases from the central region to the corner and defines a taper angle; and

wherein an inner surface of the corner includes a radiused portion by which the main region smoothly transitions into the peripheral lip.

17. A method for hot isostatic pressing a powdered material, the method comprising:

providing a canister for hot isostatic pressing, the canister comprising

a cylindrical body portion including a circular first end and a circular second end,

a first endplate welded to the circular first end of the cylindrical body portion, the first endplate comprising

a central region, and

a main region extending radially from the central region and terminating in a corner about a periphery of the endplate, the corner including a peripheral lip configured to mate with a body portion of the canister,

wherein a thickness of the endplate increases from the central region to the corner and defines a taper angle, and

wherein an inner surface of the corner includes a radiused portion by which the main region smoothly transitions into the peripheral lip,

a fill stem attached to the first endplate, wherein the fill stem provides fluid communication with an interior volume of the canister, and

a second endplate welded to the circular second end of the cylindrical body portion;

disposing at least one metallurgical powder in the canister through the fill stem;

evacuating air from the canister through the fill stem;

crimping the fill stem to hermetically seal the canister; and

hot isostatically pressing the canister to provide a hot isostatic pressed billet.

18. The method of claim 17, wherein the first endplate of the canister further comprises:

a substantially planar outer face; and

an inner face, wherein the taper angle is defined by an increasing distance between the outer face and the inner face in the main region as a distance from the central region increases.

19. The method of claim 17, wherein the peripheral lip of the first endplate of the canister further comprises:

a chamfer configured to accept a weld bead for welding the first endplate to the circular first end of the cylindrical body portion of the canister.

20. The method of claim 17, wherein the metallurgical powder is a nickel-base superalloy powder.

21. The method of claim 17, wherein the metallurgical powder is one of a Rolls Royce RR1000 alloy powder, an Alloy 10 alloy powder, and a low carbon ASTROLOY alloy powder.