CLAIMS:

1. A component for a gas turbine engine, the component comprising:

a gas path wall having a first surface and a second surface, wherein the second surface is exposed to hot gas flow; and

a cooling hole extending through the gas path wall, the cooling hole comprising:

an inlet formed in the first surface;

an outlet formed in the second surface;

cooling hole surfaces that define the cooling hole between the inlet and the outlet; and

a longitudinal ridge formed along at least one of the cooling hole surfaces, the longitudinal ridge separating the cooling hole into first and second lobes;

wherein the cooling hole diverges through the gas path wall, such that cross-sectional area of the cooling hole increases continuously from the inlet through the cooling hole to the outlet.

2. The component of claim 1, wherein the longitudinal ridge extends from the inlet along at least one of the cooling hole surfaces toward the outlet, dividing the cooling hole into the first and second lobes in a region of the inlet.

3. The component of claim 2, and further comprising:

a cusp on the inlet, wherein the longitudinal ridge extends from the cusp.

4. The component of claim 1, and further comprising:

a ridge terminus spaced along one of the cooling hole surfaces between the inlet and the outlet, wherein the longitudinal ridge terminates at the ridge terminus, and wherein the longitudinal ridge extends from the ridge terminus toward the outlet.

5. The component of claim 1, and further comprising:

a ridge transition spaced along the longitudinal ridge between the inlet and the outlet; and

a transition region of the cooling hole extending from the ridge transition to a trailing edge of the outlet.

6. The component of claim 1, wherein the longitudinal ridge is a first longitudinal ridge, and further comprising:

a second longitudinal ridge; and

a third lobe, wherein the first and second longitudinal ridges divide the cooling hole into the first, second, and third lobes.

7. The component of claim 6, and further comprising:

a ridge nexus spaced along the cooling hole between the inlet and the outlet, wherein the first and second longitudinal ridges meet at the ridge nexus, wherein the second lobe is positioned between the first and third lobes, and wherein the second lobe truncates at the ridge nexus.

8. The component of claim 7, wherein the first and second ridges join at the ridge nexus to form a single longitudinal ridge that extends from the ridge nexus toward the inlet.

9. The component of claim 6, wherein the first and second longitudinal ridges terminate at the ridge nexus such that no longitudinal ridge extends from the ridge nexus toward the inlet.

10. The component of claim 1, wherein the second surface forms one of a pressure surface, a suction surface or a platform surface of an airfoil.

11. An airfoil comprising:

a flow path wall having a first surface exposed to cooling fluid and a second surface exposed to hot gas flow;

a cooling hole formed in the flow path wall, the cooling hole laterally diverging continuously from an inlet at the first surface to an outlet at the second surface; and

a longitudinal ridge defined along the cooling hole, the longitudinal ridge structure dividing the cooling hole into first and second lobes;

wherein flow of the cooling fluid is substantially diffusive through the cooling hole, from the inlet at the first surface of the flow path wall through to the outlet at the second surface of the flow path wall.

12. The airfoil of claim 11, wherein the cooling hole diverges continuously in longitudinal and transverse directions from the inlet to the outlet, the longitudinal and transverse directions defined with respect to the hot gas flow.

13. The airfoil of claim 11, wherein the cooling hole is inclined in a downstream direction between the first surface and the second surface.

14. The airfoil of claim 11, wherein the outlet has a substantially straight or convex trailing edge.

15. The airfoil of claim 11, wherein the longitudinal ridge is a first longitudinal ridge, and further comprising:

a second longitudinal ridge; and

a third lobe, wherein the first and second longitudinal ridges divide the cooling hole into the first, second, and third lobes.

16. A gas turbine engine comprising the airfoil of claim 11.

17. A gas turbine engine component comprising:

a gas path wall having a first surface and a second surface, the second surface exposed to hot gas flow;

a cooling hole extending through the gas path wall, the cooling hole continuously diverging from an inlet in the first surface to an outlet in the second surface; and

a longitudinal ridge extending along the cooling hole, the longitudinal ridge dividing the cooling hole into first and second lobes.

18. The gas turbine engine component of claim 17, further comprising:

a cusp formed on the inlet, wherein the longitudinal ridge extends from the cusp toward the outlet along a downstream wall of the cooling hole.

19. The gas turbine engine component of claim 17, wherein the longitudinal ridge is a first longitudinal ridge, and further comprising:

a second longitudinal ridge; and

a third lobe, wherein the first and second longitudinal ridges divide the cooling hole into the first, second, and third lobes

20. The gas turbine engine component of claim 17, further comprising:

a ridge transition spaced along the longitudinal ridge between the inlet and the outlet; and

a planar or convex transition region extending along the cooling hole from the ridge transition to a trailing edge of the outlet.

CLAIMS

1. A component for a gas turbine engine, the component comprising:

a gas path wall having a first surface and a second surface, wherein the second surface is exposed to hot gas flow; and

a cooling hole extending through the gas path wall, the cooling hole comprising:

an inlet formed in the first surface;

an outlet formed in the second surface;

cooling hole surfaces that define the cooling hole between the inlet and the outlet; and

a first longitudinal ridge formed along at least one of the cooling hole surfaces, the longitudinal ridge separating the cooling hole into first and second lobes;

a second longitudinal ridge formed along at least one of the cooling hole surfaces, the longitudinal ridge separating the cooling hole into second and third lobes; and

a ridge nexus spaced along the cooling hole between the inlet and the outlet, wherein the first and second longitudinal ridges meet at the ridge nexus, wherein the second lobe is positioned between the first and third lobes, and wherein the second lobe truncates at the ridge nexus; and

wherein the cooling hole diverges through the gas path wall, such that cross-sectional area of the cooling hole increases continuously from the inlet through the cooling hole to the outlet.

2. The component of claim 1, wherein the first longitudinal ridge extends from the inlet along at least one of the cooling hole surfaces toward the outlet, dividing the cooling hole into the first and second lobes in a region of the inlet.

3. The component of claim 2, and further comprising:

a cusp on the inlet, wherein the first longitudinal ridge extends from the cusp.

4. The component of claim 1, and further comprising:

a ridge terminus spaced along one of the cooling hole surfaces between the inlet and the outlet, wherein the first longitudinal ridge terminates at the ridge terminus, and wherein the first longitudinal ridge extends from the ridge terminus toward the outlet.

5. The component of claim 1, and further comprising:

a ridge transition spaced along the first longitudinal ridge between the inlet and the outlet; and

a transition region of the cooling hole extending from the ridge transition to a trailing edge of the outlet.

6. The component of claim 1, wherein the first and second ridges join at the ridge nexus to form a single longitudinal ridge that extends from the ridge nexus toward the inlet.

7. The component of claim 1, wherein the second surface forms one of a pressure surface, a suction surface or a platform surface of an airfoil.

8. The component of claim 1, wherein the cooling hole is inclined in a downstream direction between the first surface and the second surface.

9. The component of claim 1, wherein the outlet has a substantially straight or convex trailing edge.

10. A gas turbine engine comprising the component of claim 1.

11. A component for a gas turbine engine, the component comprising:

a gas path wall having a first surface and a second surface, wherein the second surface is exposed to hot gas flow; and

a cooling hole extending through the gas path wall, the cooling hole comprising:

an inlet formed in the first surface;

an outlet formed in the second surface;

cooling hole surfaces that define the cooling hole between the inlet and the outlet; and

a first longitudinal ridge formed along at least one of the cooling hole surfaces, the first longitudinal ridge separating the cooling hole into first and second lobes;

a second longitudinal ridge formed along at least one of the cooling hole surfaces, the second longitudinal ridge separating the cooling hole into second and third lobes; and

wherein the cooling hole diverges through the gas path wall, such that cross-sectional area of the cooling hole increases continuously from the inlet through the cooling hole to the outlet, and wherein the first and second longitudinal ridges terminate at a ridge nexus such that no longitudinal ridge extends from the ridge nexus toward the inlet.