WHAT IS CLAIMED IS:

1. An electric submersible pump (ESP) assembly comprising:

a motor;

a pump driven by the motor and having a plurality of stages, each stage comprising:

an impeller for moving fluid;

a diffuser downstream of the impeller;

the diffuser and the impeller each having a plurality of vanes formed on an exterior surface;

at least some of the vanes comprising:

a leading edge at a downstream end of the vane;

a trailing edge at an upstream end of the vane;

a curved high pressure surface extending between the leading edge and the trailing edge; and

a curved low pressure surface extending between the leading edge and the trailing edge opposite the high pressure surface, the low pressure surface having a length greater than the length of the high pressure surface so that fluid flowing along the low pressure surface is substantially laminar.

2. The ESP of Claim 1, further comprising a bump formed on the low pressure surface, wherein the width of each vane increases from the leading edge to the bump and decreases from the bump to the trailing edge such that the increase and decrease in width occurs on the low pressure surface to increase the length of the low pressure surface from the leading edge to the trailing edge.

3. The ESP of Claim 2, wherein a maximum width of the bump is located about halfway between the leading edge and the trailing edge.

4. The ESP of Claim 2, wherein a maximum width of the bump is closer to the leading edge than to the trailing edge.

5. The ESP of Claim 2, wherein a maximum width of the bump is located closer to the trailing edge than to the leading edge.

6. The ESP of Claim 1, wherein the low pressure surface further comprises a base positioned on the low pressure surface proximate to the leading edge, the vane increasing in width at a first rate between the leading edge and the base and the vane increasing in width at a second rate between the base and a maximum width of the vane.

7. The ESP of Claim 6, wherein the width of the vane decreases in width from the maximum width to the trailing edge at the second rate.

8. The ESP of Claim 6, wherein the base is located proximate to a predicted location of fluid separation from the low pressure surface of the vane.

9. The ESP of Claim 1, wherein the at least some of the vanes are located on the diffuser.

10. The ESP of Claim 1, wherein the at least some of the vanes are located on the impeller.

11. An electric submersible pump (ESP) assembly comprising:

a pump having a plurality of impellers for moving fluid;

a motor coupled to the submersible pump to rotate the impellers in the pump;

a plurality of diffusers in the pump, each of the diffusers being downstream of one of the impellers;

each of the plurality of diffusers including a frustoconical body having a central bore for passage of a rotating shaft, and a plurality of vanes formed on an exterior surface of the frustoconical body;

each of the plurality of vanes comprising:

a leading edge at a downstream end of the vane;

a trailing edge at an upstream end of the vane;

a curved high pressure surface extending between the leading edge and the trailing edge;

a curved low pressure surface extending between the leading edge and the trailing edge opposite the high pressure surface, the low pressure surface having a bump formed thereon; and

wherein the width of each vane increases from the leading edge to the bump and decreases from the bump to the trailing edge such that the increase and decrease in width occurs on the low pressure surface.

12. The ESP of Claim 11, wherein a maximum width of the bump is located halfway between the leading edge and the trailing edge.

13. The ESP of Claim 11, wherein a maximum width of the bump is located proximate to the leading edge.

14. The diffuser of Claim 11, wherein a maximum width of the bump is located closer to the trailing edge than to the leading edge.

15. The ESP of Claim 11, wherein the low pressure surface further comprises a base positioned on the low pressure surface proximate to the leading edge, the vane increasing in width at a first rate between the leading edge and the base and the vane increasing in width at a second rate between the base and a maximum width of the vane.

16. The ESP of Claim 15, wherein the width of the vane decreases in width from the maximum width to the trailing edge at the second rate.

17. The ESP of Claim 15, wherein the base is located proximate to a predicted location of fluid separation from the low pressure surface of the vane.

18. An electric submersible pump (ESP) assembly comprising:

a motor;

a pump driven by the motor and having a plurality of stages, each stage comprising:

an impeller for moving fluid;

a diffuser downstream of the impeller;

the diffuser and the impeller each having a plurality of vanes formed on an exterior surface;

at least some of the vanes comprising:

a leading edge at a downstream end of the vane;

a trailing edge at an upstream end of the vane;

a curved high pressure surface extending between the leading edge and the trailing edge; and

a curved low pressure surface extending between the leading edge and the trailing edge opposite the high pressure surface, the low pressure surface having two radii of curvature, one radius at least two to four times greater than the other radius so that fluid flowing along the low pressure surface is substantially laminar.

19. The ESP of Claim 18, wherein the low pressure surface further comprises a base positioned on the low pressure surface proximate to the leading edge, the vane increasing in width at a first rate along the greater radius of curvature between the leading edge and the base and the vane increasing in width at a second rate along the other radius of curvature between the base and a maximum width of the vane.

20. The ESP of Claim 19, wherein the width of the vane decreases in width from the maximum width to the trailing edge at the second rate along the other radius of curvature.

What is claimed is:

1. An electric submersible pump (ESP) assembly comprising:

a motor;

a pump driven by the motor and having a plurality of stages, each stage comprising:

an impeller for moving fluid;

a diffuser downstream of the impeller:

the diffuser and the impeller each having a plurality of vanes formed on an exterior surface;

at least some of the vanes comprising;

a leading edge at a upstream end of the vane;

trailing edge at an downstream end of the vane;

a curved high pressure surface extending between the leading edge and the trailing edge;

a curved low pressure surface extending between the leading edge and the trailing edge opposite the high pressure surface, the low pressure surface having a length greater than a length of the high pressure surface so that fluid flowing the low pressure surface is substantially laminar;

a bump formed on the low pressure surface, the bump having a first end, a second end, and a length between the first and second ends that is less than the length of the low pressure surface;

wherein the bump has a radius of curvature that is smaller than a radius of curvature of other portions of the low pressure surface; and wherein

the vane has a width measured from the low pressure surface to the high pressure surface that is greater within the bump than on the other of the vane.

2. The ESP of claim 1, wherein the width of each vane increases from the leading edge to the first end of the bump and decreases from the second end of the bump to the trailing edge.

3. The ESP of claim 2, wherein a maximum width of the vane is located about halfway between the leading edge and the trailing edge.

4. The ESP of claim 1, wherein a maximum width of the vane is closer to the leading edge than to the trailing edge.

5. The ESP of claim 1, wherein a maximum width of the vane is located closer to the trailing edge than to the leading edge.

6. The ESP of claim 1, wherein the width of the vane increases at a first rate between the leading edge and the first end of the bump and the width of the vane increases at a second rate between the first end and a maximum width of the vane, which is located between the first and second ends of the bump, the second rate being greater than the first rate.

7. The ESP of claim 6, wherein the width of the vane decreases from the maximum width to the second end of the bump at the second rate.

8. The ESP of claim 6, wherein the width of the vane decreases from the second end to the trailing edge at the first rate.

9. The ESP of claim 1, wherein the radius of curvature of the bump has a center point spaced from a center point of the radius of curvature of the remaining portion of the low pressure surface.

10. The ESP of claim 1, wherein a maximum width of the vane is located halfway between the first and second ends of the bump.

11. An electric submersible pump(ESP)assembly comprising:

a pump having a plurality of impellers of moving fluid;

a motor coupled to the submersible pump to rotate the impellers in the pump;

a plurality of diffusers in the pump, each of the diffusers being downstream of one of the impellers;

each of the plurality of diffusers including a frustoconical body having a central bore for passage of a rotating shaft, and a plurality of vanes formed on an exterior surface of the frustoconical body;

each of the plurality of vanes comprising:

a leading edge at a upstream end of the vane;

a trailing edge at an downstream end of the vane;

a curved high pressure surface extending between the leading edge and the trailing edge;

a curved low pressure surface extending between the leading edge and the trailing edge opposite the high pressure surface, the low pressure surface having a bump formed thereon;

the bump having a first end and a second end, the first end of the bump being closer to the leading edge of the vane than to the trailing edge of the vane;

wherein a width of each vane measured from the high pressure surface to the low pressure surface increases at a first rate from the leading edge to the first end of the bump and increases at a second rate from the first end of the bump to a maximum width of the bump, the second rate being greater than the first rate.

12. The ESP of claim 11, wherein the maximum width of the bump is located halfway between the leading edge and the trailing edge.

13. The ESP of claim 11, wherein the maximum width of the bump is between two and four times a width of the vane at the first end.

14. The ESP of claim 11, wherein the maximum width of the bump is located closer to the trailing edge than to the leading edge.

15. The ESP of claim 11, wherein the width of the vane decreases at the second rate from the maximum width of the bump to the second end of the bump.

16. The ESP of claim 15, wherein the width of the vane decreases in width at the first rate from the second end of the bump to the trailing edge.

17. The ESP of claim 15, wherein the second end of the bump is located at the trailing edge.

18. An electric submersible pump (ESP) assembly comprising:

a motor;

a pump driven by the motor and having a plurality of stages, each stage comprising:

an impeller for moving fluid;

a diffuser downstream of the impeller;

the diffuser and the impeller each having a plurality of vanes formed on an exterior surface;

at least some of the vanes comprising:

a leading edge at a upstream end of the vane;

a trailing edge at an downstream end of the vane;

a curved high pressure surface extending between the leading edge and the trailing edge; and

a curved low pressure surface extending between the leading edge and the trailing edge opposite the high pressure surface, the low pressure surface having a first radius of curvature and a second radius of curvature, the second radius of curvature being smaller than the first rate of curvature, defining a bump having a first end and a second end, the vane having a maximum width measured from the low pressure surface to the high pressure surface and located between the first and second ends of the bump at least two to four times greater than a width of the vane at the first end of the bump.

19. The ESP of claim 18, wherein the width of the vane increases at a first rate along the first radius of curvature between the leading edge and the first end of the bump and the width of the vane increases in at a second rate along the second radius of curvature between the first end of the bump and the maximum width of the vane, the second rate being greater than the first rate.

20. The ESP of claim 19, wherein the width of the vane decreases from the maximum width of the vane to the second end of the bump at the second rate.