CLAIMS

1. A mixing system, comprising:

a primary vortex mixer, the primary vortex mixer comprising:

a primary vortex mixing chamber having a first wall, a second wall, and a side wall connecting the first wall and the second wall;

at least two inlet ports configured along the side wall, each inlet port having an inlet channel connected thereto, the at least two inlet ports approximately equally spaced around the primary vortex mixing chamber and configured tangentially to the primary vortex mixing chamber;

an additional inlet port; and

an exit port having an exit channel connected thereto, said exit port configured approximately at a radial center of the second wall, the exit channel extending from the exit port and away from the primary vortex mixing chamber; and

a splitter having a first outlet, and a second outlet, the first outlet connected to a first of the at least two inlet ports of the primary vortex mixer, and the second outlet connected to a second of the at least two inlet ports of the primary vortex mixer.

2. The mixing system of claim 1, further comprising a secondary vortex mixer, the secondary vortex mixer comprising:

a secondary vortex mixing chamber having a first wall, a second wall, and a side wall connecting the first wall and the second wall;

at least two inlet ports configured along the side wall, each inlet port having an inlet channel connected thereto, the at least two inlet ports approximately equally spaced around the secondary vortex mixing chamber and configured tangentially to the secondary vortex mixing chamber; and

an exit port having an exit channel connected thereto, the exit port configured approximately at a radial center of the second wall, the exit channel extending from the exit port and away from the secondary vortex mixing chamber.

3. The mixing system of claim 2, wherein the additional inlet port of the primary vortex mixer is connected to the exit channel extending from the secondary vortex mixer exit port.

4. The mixing system of claim 2, wherein the splitter of the primary vortex mixer is configured at an end of the exit channel extending from the secondary vortex mixer exit port.

5. The mixing system of claim 1, wherein the primary vortex mixing chamber is round and the side wall extends around the circumference of the first wall and the second wall

6. The mixing system of claim 1, wherein the additional inlet port is configured at a radial center of the first wall of the primary vortex mixer.

7. The mixing system of claim 1, wherein the inlet channel connected to the first of the at least two inlet ports of the primary vortex mixer is perpendicular to the first outlet of the splitter and the inlet channel connected to the second of the at least two inlet ports of the primary vortex mixer is perpendicular to the second outlet of the splitter.

8. The mixing system of claim 1, wherein the additional inlet port is connected to an additional inlet channel.

9. The mixing system of claim 1, wherein the additional inlet channel includes a first section and a second section, the second section being connected to the additional inlet port.

10. The mixing system of claim 9, wherein the second section is approximately perpendicular to the first section.

11. The mixing system of claim 9, wherein the second section is approximately perpendicular to the (1) inlet channel connected to the first of the at least two inlet ports of the primary vortex mixer, and (2) the inlet channel connected to the second of the at least two inlet ports of the primary vortex mixer.

12. The mixing system of claim 2, wherein each inlet channel of the secondary vortex mixer receives fluid from a single source.

13. The mixing system of claim 2, wherein each inlet channel of the secondary vortex mixer receives fluid from a different source.

14. The mixing system of claim 2, wherein the secondary vortex mixer has four inlet ports.

15. The mixing system of claim 14, wherein a first two of the four inlet ports of the secondary vortex mixer receive fluid from a first source, and a second two of the four inlet ports of the secondary vortex mixer receive fluid from a second source.

16. A mixing system, comprising:

a primary vortex mixer, the primary vortex mixer comprising:

a primary vortex mixing chamber having a first wall, a second wall, and a side wall connecting the first wall and the second wall;

at least two inlet ports configured along the side wall, each inlet port having an inlet channel connected thereto, the at least two inlet ports approximately equally spaced around the primary vortex mixing chamber and configured tangentially to the primary vortex mixing chamber;

an additional inlet port configured approximately at a radial center of the first wall, the additional inlet port having an additional inlet channel connected thereto; and

an exit port having an exit channel connected thereto, the exit port configured approximately at a radial center of the second wall, the exit channel extending from the exit port and away from the primary vortex mixing chamber; and

a splitter having a first outlet, and a second outlet, the first outlet connected to a first of the at least two inlet ports of the primary vortex mixer, and the second outlet connected to a second of the at least two inlet ports of the primary vortex mixer.

17. The mixing system of claim 16, further comprising a secondary vortex mixer, the secondary vortex mixer comprising:

a secondary vortex mixing chamber having a first wall, a second wall, and a side wall connecting the first wall and the second wall;

four inlet ports configured along the side wall, each inlet port having an inlet channel connected thereto, the four inlet ports approximately equally spaced around the secondary vortex mixing chamber and configured tangentially to the secondary vortex mixing chamber; and

an exit port having an exit channel connected thereto, the exit port configured approximately at a radial center of the second wall, the exit channel extending from the exit port and away from the secondary vortex mixing chamber.

18. The mixing system of claim 16, wherein the inlet channel connected to the first of the at least two inlet ports of the primary vortex mixer is perpendicular to the first outlet of the splitter and the inlet channel connected to the second of the at least two inlet ports of the primary vortex mixer is perpendicular to the second outlet of the splitter.

19. The vortex mixer of claim 17, wherein the four inlet channels of the secondary vortex mixer receives fluid from a single source.

20. The vortex mixer of claim 17, wherein each inlet channel of the secondary vortex mixer receives fluid from a different source.

21. The mixing system of claim 17, wherein a first two of the four inlet ports of the secondary vortex mixer receive fluid from a first source, and a second two of the four inlet ports of the secondary vortex mixer receive fluid from a second source.

22. The mixing system of claim 17, wherein the splitter of the primary vortex mixer is configured at an end of the exit channel extending from the secondary vortex mixer exit port.