CLAIMS

1. A heat exchanger, comprising:

a shell having a longitudinal axis;

a plurality of helical baffles inside the shell and arranged along the longitudinal axis in an alternating pattern of a first baffle followed by a second baffle of the plurality of helical baffles;

a plurality of holes in the plurality of helical baffles, the plurality of holes including first holes having a first diameter and second holes having a second diameter greater than the first diameter; and

a plurality of tubes received in the plurality of holes in the plurality of baffles.

2. The heat exchanger of claim 1, wherein a clearance between the plurality of tubes and the first holes is approximately 1/32 inch or greater than 1/32 inch.

3. The heat exchanger of claim 2, wherein a clearance between the plurality of tubes and the second holes is at least 1/16 inch.

4. The heat exchanger of claim 1, wherein the first holes in the first baffle are aligned with the second holes in the second baffle, and

wherein the second holes in the first baffle are aligned with the first holes in the second baffle.

5. The heat exchanger of claim 1, wherein the first holes and the second holes of the plurality of helical baffles are arranged in an alternating pattern.

6. The heat exchanger of claim 1, wherein a baffle overlap between successive baffles of the plurality of helical baffles is at least 40%.

7. The heat exchanger of claim 1, wherein a clearance between the plurality of tubes and the first holes is less than a clearance between the plurality of tubes and the second holes.

8. The heat exchanger of claim 1, wherein a clearance between the plurality of tubes and the first holes is configured to define a first leakage stream and a clearance between the

plurality of tubes and the second holes is configured to define a second leakage stream having a flow volume greater than the first leakage stream.

9. The heat exchanger of claim 1, wherein the plurality of tubes are mechanically supported by the plurality of holes only in every other baffle.

10. A heat exchanger, comprising:

a shell;

a plurality of baffles inside the shell;

a plurality of holes in the plurality of baffles;

a plurality of tubes received in the plurality of holes in the plurality of baffles;

a first clearance between each of first holes of the plurality of holes and corresponding ones of the plurality of tubes; and

a second clearance between each of second holes of the plurality of holes and corresponding ones of the plurality of tubes, wherein the second clearances are greater than the first clearances and configured to increase a leakage stream through the second clearances relative to the leakage stream through the first clearances.

11. The heat exchanger of claim 10, wherein the second clearance is at least two times greater than the first clearance.

12. The heat exchanger of claim 10, wherein the first holes have a first diameter and the second holes have a second diameter, the second diameter being greater than the first diameter.

13. The heat exchanger of claim 10, wherein the plurality of baffles are a plurality of helical baffles arranged in an alternating pattern of first baffles and second baffles.

14. The heat exchanger of claim 13, wherein each of the first baffles and the second baffles include first holes and second holes of the plurality of holes, the first holes and second holes of the first baffles arranged in an inverse pattern to the first holes and second holes of the second baffles.

15. The heat exchanger of claim 10, wherein the plurality of tubes are mechanically supported at the first holes in every other baffle of the plurality of baffles.

16. The heat exchanger of claim 10, wherein the first holes and the second holes are arranged in an alternating pattern on the plurality of baffles.

17. A heat exchanger, comprising:

a shell;

a plurality of baffles inside the shell;

a plurality of first holes in the plurality of baffles;

a plurality of tubes received in the plurality of first holes in the plurality of baffles; and

a plurality of second holes in the plurality of baffles between at least some of the plurality of first holes.

18. The heat exchanger of claim 17, wherein the plurality of first holes have a diameter greater than a diameter of the plurality of second holes.

19. The heat exchanger of claim 17, wherein the plurality of second holes are between all of the plurality of first holes.

20. The heat exchanger of claim 17, wherein a clearance between the plurality of tubes and the plurality of first holes is 1/32 inch.