Claims

1. A heat transfer device comprising:

   at least one channel including an upstream zone, a downstream zone, and a mixing zone intermediate the upstream and downstream zones;

   the upstream zone including an upstream separating configuration arranged to separate an inflow to the upstream zone into a plurality of upstream sub-flows; and

   the mixing zone including a converging configuration arranged to converge at least two upstream sub-flows into the mixing zone to form a primary mixed flow;

   further comprising a diverting configuration immediate the upstream separating configuration and the converging configuration; said diverting configuration arranged to divert one upstream sub-flow of the plurality of upstream sub-flows to mix with another upstream sub-flow of the plurality of upstream sub-flows to form a secondary mixed flow.

2. The heat transfer device according to claim 1, wherein the upstream separating configuration includes an upstream separating fin arranged to separate the inflow to the upstream zone into first and second upstream sub-flows.

3. The heat transfer device according to claim 1 or 2, wherein the downstream zone includes the downstream separating configuration and said downstream separating configuration is arranged to separate the primary mixed flow into a plurality of downstream sub-flows.

4. The heat transfer device according to claim 3, wherein the downstream separating configuration includes a downstream separating fin arranged to separate the primary mixed flow into first and second downstream sub-flows.

5. The heat transfer device according to any one of claims 1 to 4, wherein the converging configuration is continuous with a wall of the channel to mix all upstream sub-flows into the primary mixed flow.

6. The heat transfer device according to claim 1 or 2, wherein the upstream separating configuration is spatially offset from a converging fin of the converging configuration.

7. The heat transfer device according to any one of claims 3 to 5, wherein the downstream separating configuration is spatially offset from a converging fin of the converging configuration.

8. The heat transfer device according to any one of claims 1 to 7, wherein the diverting configuration comprises a diverting fin spatially offset from the converging configuration and/or the upstream separating configuration.

9. A method of heat transfer comprising:
providing a heat transfer device containing at least one channel including an upstream zone, a downstream zone, and a mixing zone intermediate the upstream and downstream zones;

separating an inflow to the upstream zone into a plurality of upstream sub-flows by a upstream separating configuration; and

converging at least two upstream sub-flows into the mixing zone to form a primary mixed flow by a converging configuration;

further comprising diverting one upstream sub-flow to mix with another upstream sub-flow to form a secondary mixed flow by a diverting configuration immediate the upstream separating configuration and the converging configuration.

10. The method according to claim 9, further comprising separating the primary mixed flow into a plurality of downstream sub-flows by a downstream separating configuration.