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 or downstream separating configuration and the converging configuration.

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 a downstream separating configuration 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 a 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 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 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; and
converging at least two upstream sub-flows into the mixing zone to form a primary mixed flow;
further comprising diverting one upstream sub-flow to mix with another upstream sub-flow to form a secondary mixed flow.

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