

Claims

1. A heat exchange unit for a heat exchanger, the heat exchange unit comprising:
a plurality of plain fins stacked perpendicularly to a first plane, such that
5 a first fluid is communicable through the first plane between the fins; and
a plurality of tubes for communicating a second fluid therethrough for
heat exchange with the first fluid, the tubes extending perpendicularly through
the fins, each tube comprising an oblique cross-section having a pair of
opposing first sides and a pair of opposing second sides,
10 wherein for each oblique cross-section, the first sides are perpendicular
to the first plane and the second sides are angled approximately 60° to the first
plane, the first sides being longer than the second sides.
2. The heat exchange unit according to claim 1, wherein each tube comprises an
15 internal rib extending therethrough.
3. The heat exchange unit according to claim 1 or 2, wherein the tubes are joined
to the fins by brazing.
- 20 4. The heat exchange unit according to any one of claims 1 to 3, wherein each fin
comprises a plurality of collars joining the tubes to the fin.
5. The heat exchange unit according to any one of claims 1 to 4, wherein each
tube is filleted at edges thereof represented by corners of the oblique cross-section.
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6. The heat exchange unit according to any one of claims 1 to 5, wherein the tubes
are identically oriented relative to the first plane.
7. The heat exchange unit according to any one of claims 1 to 6, wherein the tubes
30 are arranged along a single row of each fin and along the first plane.
8. The heat exchange unit according to any one of claims 1 to 7, wherein the tubes
are formed of an aluminium material.

9. A method for manufacturing a heat exchange unit for a heat exchanger, the method comprising:

forming a plurality of holes in each of a plurality of plain fins;

5 stacking the fins perpendicularly to a first plane, such that a first fluid is communicable through the first plane between the fins;

forming a plurality of tubes for communicating a second fluid therethrough for heat exchange with the first fluid, each tube comprising an oblique cross-section having a pair of opposing first sides and a pair of opposing second sides, the first sides being longer than the second sides;

10 inserting the tubes into the holes and perpendicularly through the fins, such that for each oblique cross-section, the first sides are perpendicular to the first plane and the second sides are angled approximately 60° to the first plane; and

15 performing a joining process for joining the tubes to the fins to thereby form the heat exchange unit.

10. The method according to claim 9, wherein each tube comprises an internal rib extending therethrough.

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11. The method according to claim 9 or 10, wherein the joining process comprises a brazing process for brazing the tubes to the fins.

12. The method according to any one of claims 9 to 11, wherein said forming of the holes in each fin comprises forming a collar at each hole for joining the tubes to the fin.

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13. The method according to any one of claims 9 to 12, wherein each tube is filleted at edges thereof represented by corners of the oblique cross-section.

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14. The method according to any one of claims 9 to 13, wherein the holes in the fins are formed such that the tubes are identically oriented relative to the first plane.

15. The method according to any one of claims 9 to 14, wherein the holes are formed along a single row of each fin and along the first plane.

16. A heat exchanger comprising:

- 5 an inlet for receiving a second fluid;
an outlet for discharging the second fluid; and
a heat exchange unit comprising:
a plurality of plain fins stacked perpendicularly to a first plane,
such that a first fluid is communicable through the first plane between
10 the fins; and
a plurality of tubes fluidically communicative with the inlet and
outlet for communicating the second fluid therethrough for heat
exchange with the first fluid, the tubes extending perpendicularly through
the fins, each tube comprising an oblique cross-section having a pair of
15 opposing first sides and a pair of opposing second sides,
wherein for each oblique cross-section, the first sides are
perpendicular to the first plane and the second sides are angled
approximately 60° to the first plane, the first sides being longer than the
second sides.

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17. The heat exchanger according to claim 16, further comprising a set of headers joined to the tubes and fluidically communicative with the inlet and outlet, each header comprising a set of baffles for distributing the second fluid through the tubes.

25 18. The heat exchanger according to claim 16 or 17, further comprising a plurality of extension elbows for joining the tubes to another plurality of tubes, each extension elbow comprising oblique cross-sectional ends.

19. The heat exchanger according to any one of claims 16 to 18, wherein each tube
30 further comprises an internal rib extending therethrough.

20. The heat exchanger according to any one of claims 16 to 19, wherein the tubes are formed of an aluminium material.