Title (en)

HEAT EXCHANGER FOR USE WITH OSCILLATING FLUIDS IN PARTICULAR IN A THERMOACOUSTIC CELL

Title (de)

WÄRMETAUSCHER ZUR VERWENDUNG IN OSZILLIERENDEN STRÖMUNGSMEDIEN, INSBESONDERE IN THERMO-AKUSTISCHER ZELLE

Title (fr)

ECHANGEUR DE CHALEUR POUR APPLICATION AUX FLUIDES OSCILLANTS NOTAMMENT DANS UNE CELLULE THERMOACOUSTIQUE

Publication

EP 1570214 A1 20050907 (FR)

Application

EP 03796162 A 20031204

Priority

- FR 0303591 W 20031204
- FR 0215296 A 20021204

Abstract (en)

[origin: FR2848293A1] A heat exchanger has an exchange surface S made of unitary elements of dimension Lc with heat exchange approximatelyF between a primary fluid at temperature Tf and a secondary fluid giving a wall temperature Ts, such that approximatelyF/(Tf - Ts) = S.C.A.F.Lcn, where F and A are characteristics respectively of the primary fluid and the acoustic wave, and C and n are both characteristics of the type of flow The associated Reynolds number RELc is between 3 x 10 power 3 and 3 x 10 power 5 and the passage dimensions D much greater than the thickness of the thermal layer limit deltak along the walls of the exchanger. The exchanger is made of a bundle of tubes of diameter D or of parallel plates spaced at a distance D and the constant C is 2.06 and the power n is -1/2. F = lambda.Pr(-1/6) where lambda is the thermal conductivity coefficient of the primary fluid and Pr its Prandtl number. A = (2.(ul)1/2/deltakx(omega)1/2)1/2 where ul is the particular speed and omega the pulsation. Alternatively, the associated Reynolds number ReLc is greater than 3 x 10 power 5 and the passage dimensions D much greater than the thickness of the thermal layer limit deltak along the walls of the exchanger. In this case, C is 0.118 and n is -1/5. F = lambda.Pr(7/15) and A = 2(4/5).(ul)(4/5)/(deltak(8/5).omega(4/5). An Independent claim is included for a thermal machine operating with an oscillating fluid containing at least one head exchanger as described above, and at least one thermoacoustic cell.

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IPC 8 full level

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