

















- on convection heat transfer from a circular cylinder. *Journal of Heat Transfer*, 119(3): 474. <https://doi.org/10.1115/1.2824121>
- [18] Aldana, L., Chochol, A., Ferraro, T. (2008). Compositions and methods for eliminating and preventing vehicle odors, WO2008/025168A1.
- [19] Max, M.D. (2010). Atmospheric moisture harvesting. US2010/0307181A1.
- [20] Tan, H., Xu, G., Tao, T., Sun, X., Yao, W. (2015). Experimental investigation on the defrosting performance of a finned-tube evaporator using intermittent ultrasonic vibration. *Applied Energy*, 158: 220-32. <https://doi.org/10.1016/j.apenergy.2015.08.072>
- [21] Wang, D., Tao, T., Xu, G., Luo, A., Kang, S. (2012). Experimental study on frosting suppression for a finned-tube evaporator using ultrasonic vibration. *Experimental Thermal and Fluid Science*, 36: 1-11. <https://doi.org/10.1016/j.expthermflusci.2011.03.002>
- [22] Li, D., Chen, Z. (2014). Experimental study on instantaneously shedding frozen water droplets from cold vertical surface by ultrasonic vibration. *Experimental Thermal and Fluid Science*, 53: 17-25. <https://doi.org/10.1016/j.expthermflusci.2013.10.005>
- [23] Tan, H., Tao, T., Xu, G., Zhang, S., Wang, D., Luo, X. (2014). Experimental study on defrosting mechanism of intermittent ultrasonic resonance for a finned-tube evaporator. *Experimental Thermal and Fluid Science*, 52: 308-17. <https://doi.org/10.1016/j.expthermflusci.2013.10.006>
- [24] Tan, H., Xu, G., Tao, T., Zhang, S., Luo, A. (2016). Investigation on the ultrasonic propagation mechanism and its application on air-source heat pump defrosting. *Applied Thermal Engineering*, 107: 479-92. <https://doi.org/10.1016/j.aplthermaleng.2016.06.185>
- [25] Cole, J.T. (2007). Method and apparatus for removing moisture from evaporator coils. US007269967B2.
- [26] Wu, X.M., Webb, R.L. (2001). Investigation of the possibility of frost release from a cold surface. *Experimental Thermal and Fluid Science*, 24(3-4): 151-6. [https://doi.org/10.1016/S0894-1777\(01\)00045-0](https://doi.org/10.1016/S0894-1777(01)00045-0)
- [27] Qi, Z. (2013). Water retention and drainage on air side of heat exchangers—A review. *Renewable and Sustainable Energy Reviews*, 28: 1-10. <https://doi.org/10.1016/j.rser.2013.07.014>
- [28] Tumble dryers for household use - Methods for measuring the performance (IEC 61121:2013). (2013). European Standard EN 61121.
- [29] Arkles, B. (2006). Hydrophobicity, hydrophilicity and silanes article. *Paint and Coatings Industry*, 22(10): 114.
- [30] ANSYS, Inc. (2013). ANSYS Fluent Theory Guide, 275 Technology Drive Canonsburg, PA 15317.
- [31] Bernardin, J.D., Mudawar, I., Walsh, C.B., Franses, E.I. (1997). Contact angle temperature dependence for water droplets on practical aluminum surfaces. *International Journal of Heat and Mass Transfer*, 40(5): 1017-33. [https://doi.org/10.1016/0017-9310\(96\)00184-6](https://doi.org/10.1016/0017-9310(96)00184-6)
- [32] Frigo, M., Johnson, S.G. (2005). The design and implementation of FFTW3. *Proceedings of the IEEE*, 93(2): <https://doi.org/10.1109/jproc.2004.840301>
- [33] Jiang, H., Aute, V., Radermacher, R. (2006). Coildesigner: A general purpose simulation and design tool for air-to-refrigerant heat exchangers. *International Journal of Refrigeration*, 29: 601-610. <https://doi.org/10.1016/j.ijrefrig.2005.09.019>

## NOMENCLATURE

a	acceleration, m. s <sup>-2</sup>
A	heat transfer area, m <sup>-2</sup>
Ca	Capillary number
D	diameter, m
g	gravitational acceleration, m.s <sup>-2</sup>
Hz	hertz, Hz
kg	kilogram, kg
kWh	kilowatt-hours, kW.h
k	thermal conductivity, W.m <sup>-1</sup> . K <sup>-1</sup>
L	depth of heat transfer side along the fin
m	amount of condensate, kg.
P	Power, P.
Re	Reynolds number
RH	relative humidity, %.
S	standard deviation
T	temperature, °C
U	free stream velocity, m.s <sup>-1</sup>
We	Weber number
AWG	Atmospheric Water Generator
CFD	Computational Fluid Dynamics
CSF	Continuum Surface Force
CSS	Continuum Surface Stress
DC	Direct Current
FFT	Fast Fourier Transform
FFTW	Fastest Fourier Transform in the West
MIPC	Mechanical Impact Plate Combined
OC	Oscillator Combined
PLC	Programmable Logic Controller
UDF	User Defined Function
VoF	Volume of Fluid

## Greek symbols

$\rho$	density, kg. m <sup>-3</sup>
$\sigma$	surface tension, N. m <sup>-1</sup>
$\nu$	kinematic viscosity, m <sup>2</sup> .s <sup>-1</sup>
$\mu$	dynamic viscosity, kg. m <sup>-1</sup> .s <sup>-1</sup>
$\Theta$	contact angle
$\tau$	stress tensor

## Subscripts

h	hydraulic
eff	effective
w	water
pq	mass transfer from phase p to q
qp	mass transfer from phase q to p

216-31.