

Pool Boiling Curve Dataset — Readme

Description

This dataset is a collection of boiling curves, wall temperature versus wall heat flux, for saturated pool boiling of deionized/distilled water at atmospheric pressure on nominally flat, bare, polished copper surfaces. The data were extracted from the published figures and tables of 11 peer-reviewed pool boiling studies [1–11]. The compiled dataset contains 350 points spanning 13 curves from 11 papers.

Data structure

The dataset folder is organised as follows

[d1] boiling_curve_literature_data.csv, the compiled dataset: 350 rows $\times$ 12 columns, one row per extracted data point

[f1] boiling_curve_literature_summary.png, the summary boiling-curve figure built from [d1].

Column schema of the compiled dataset [d1]

Column	Description
paper_id	Short identifier of the source paper
figure_id	Which cropped figure or table file the point came from, e.g. fig_4, fig_3a, table_2.
curve_id	Which series within that figure or table the point belongs to, when a paper reports more than one reference surface or repeat run, e.g. bare_copper, polished_cu, ref_run1.
x_value	Wall superheat as read from the source, $\Delta T = T_{\text{wall}} - T_{\text{sat}}$.
x_unit	Unit of x value. All rows in this dataset are K.
y_value	Wall heat flux as read from the source, in the source's own units.
y_unit	Unit of y value depending on the source axis.
wall_superheat_K	Derived. Wall superheat in kelvin; °C and °F differences converted, K values pass through unchanged.
heat_flux_W_m2	Derived. Heat flux in W/m ²
source_type	Extraction tier: reported_table, vector_digitized_figure, or raster_digitized_figure.
extraction_method	How the value was obtained
notes	Which cropped file the point came from, the marker colour/shape or dash pattern used to isolate the series, why

Column	Description
	vector or raster extraction was chosen, and whether any series had to be merged.

References

- [1] Allred, T. P., Weibel, J. A. and Garimella, S. V., 2019. The petal effect of parahydrophobic surfaces offers low receding contact angles that promote effective boiling. *International Journal of Heat and Mass Transfer*, 135, pp. 403–412. doi:10.1016/j.ijheatmasstransfer.2019.02.002
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- [3] Dharmendra, M., Suresh, S., Sujith Kumar, C. S. and Yang, Q., 2016. Pool boiling heat transfer enhancement using vertically aligned carbon nanotube coatings on a copper substrate. *Applied Thermal Engineering*, 99, pp. 61–71. doi:10.1016/j.applthermaleng.2015.12.081 [note: the dataset folder is named "dharmendra_2026"; the correct publication year is 2016]
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- [10] Shi, B., Wang, Y.-B. and Chen, K., 2015. Pool boiling heat transfer enhancement with copper nanowire arrays. *Applied Thermal Engineering*, 75, pp. 115–121. doi:10.1016/j.applthermaleng.2014.09.040

- [11] Allred, T. P., Weibel, J. A. and Garimella, S. V., 2018. Enabling highly effective boiling from superhydrophobic surfaces. *Physical Review Letters*, 120(17), 174501. doi:10.1103/PhysRevLett.120.174501
- [12] Rohsenow, W. M., 1952. A method of correlating heat-transfer data for surface boiling of liquids. *Transactions of the ASME*, 74(6), pp. 969–976.