

Abstract Submitted
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More Puddle Jumping BABAK ATTARI, Rheem Manufacturing, MARK WEISLOGEL, ANDREW WOLLMAN , YONGKANG CHEN, Portland State University, TREVOR SNYDER, 3D Systems — Large droplets and puddles jump spontaneously from sufficiently hydrophobic surfaces during routine drop tower tests. The simple low-cost passive mechanism can in turn be used as an experimental device to investigate dynamic droplet phenomena for drops up to 10,000 times larger than their normal terrestrial counterparts. We provide or confirm quick and qualitative design guides for such ‘drop shooters’ as employed in drop tower tests including relationships to predict droplet ejection durations and velocities as functions of drop volume, surface texture, surface contour, wettability pattern, drop volume, and fluid properties including contact angle. The latter are determined via profile image comparisons with numerical equilibrium interface computations. Water drop volumes of 0.04 to 400 mL at ejection speeds of -0.007 to 0.12 m/s are demonstrated. An example application of the puddle jump method is made to the classic problem of regime mapping for low-gravity phase change heat transfer for large impinging drops. Many other candidate problems might be identified.

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