Abstract Submitted
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Droplet Breakup Mechanisms in Air-blast Atomizers AMIR AB-
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ing University of British Columbia, KELLY LIM, BASc Candidate Mechanical En-
gineering University of British Columbia — Atomization processes are encountered
in many natural and man-made phenomena. Examples are pollen release by plants,
human cough or sneeze, engine fuel injectors, spray paint and many more. The
physics governing the atomization of liquids is important in understanding and uti-
lizing atomization processes in both natural and industrial processes. We have ob-
served the governing physics of droplet breakup in an air-blast water atomizer using
a high magnification, high speed, and high resolution LASER imaging technique.
The droplet breakup mechanisms are investigated in three major categories. First,
the liquid drops are flattened to form an oblate ellipsoid (lenticular deformation).
Subsequent deformation depends on the magnitude of the internal forces relative
to external forces. The ellipsoid is converted into a torus that becomes stretched
and disintegrates into smaller drops. Second, the drops become elongated to form a
long cylindrical thread or ligament that break up into smaller drops (Cigar-shaped
deforation). Third, local deformation on the drop surface creates bulges and pro-
tuberances that eventually detach themselves from the parent drop to form smaller
drops.

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