



## Characterization of fuel spray for a marine burner back-spill atomizer

Cafaggi, Giovanni; Jensen, Peter Arendt; Glarborg, Peter; Clausen, Sønnik; Dam-Johansen, Kim

*Publication date:*  
2018

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*

Cafaggi, G., Jensen, P. A., Glarborg, P., Clausen, S., & Dam-Johansen, K. (2018). *Characterization of fuel spray for a marine burner back-spill atomizer*. Abstract from IFRF 2018 Conference, Sheffield, United Kingdom.

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

**Abstract:**

Oral session preferred

**CHARACTERIZATION OF FUEL SPRAY FOR A MARINE BURNER BACK-SPILL ATOMIZER**

**Giovanni Cafaggi<sup>1</sup>, Peter Arendt Jensen<sup>1</sup>, Peter Glarborg<sup>1</sup>, Sønnik Clausen<sup>1</sup>, Kim Dam-Johansen<sup>1</sup>**

gioc@kt.dtu.dk

<sup>1</sup> Technical University of Denmark, Department of Chemical and Biochemical Engineering, Søtofts Plads, 2800-Kgs.Lyngby, Denmark

Atomization is a key process in liquid fuel combustion: the droplet sizes and velocities are a determining factor in fuel penetration into the oxidizer, and therefore have a primary effect on the mixing conditions, flame shape and stability in combustion chambers. It is common practice to consider macroscopic parameters to design or choose an appropriate atomizer. It is however desirable to obtain a more detailed knowledge of the spray characteristics of specific atomizers. These data can be used to validate or as boundary conditions in CFD simulations, but also to evaluate the flexibility of an existing system regarding various fuel properties or operating conditions. The aim of this study is to obtain detailed data for droplet size and velocities produced by a back-spill hydraulic nozzle used in a marine auxiliary boiler. To do so, different regions of the spray produced in an atomizer test rig has been captured with an optical measuring system. The experiments reproduced the operating condition of the real boiler at partial and full load. Different test liquids have been used to observe the effect of varying viscosity and surface tension. Results include distribution of droplet size, position, velocity magnitude and direction for the various experiments. It is also shown that there is a strong dependence between these parameters, suggesting that lumping each in an independent distribution causes the loss of relevant information.