

SprayCalc

Calculation Tool for Characterization of Thermodynamic and Reaction Behavior of Sprays for Design of Chemical Engineering Processes

Funded by the Federal Ministry of Economic Affairs and Energy under the project funding reference number 20259 BG/2 for the period February 2019 – July 2021

Project Partner:

- Technical University of Dresden (project management), Institute of Process Engineering and Environmental Technology, Chair of Energy Process Engineering
- KIT, ITC

In the field of chemical process engineering, spray applications are common for the distinct injection of liquids into the reaction zone. Especially small and medium-sized companies in the field of industrial manufacturing equipment are faced with a double challenge: on the one hand to design processes according to the customer's requirements while keeping costs down and on the other hand to assume full warranty. To cover this challenge, an analytical model that allows for operation with standard software tools and guarantees for flexible usage is necessary to guarantee for company internal design of spray parameters. To use this tool on standard PCs for process design as well as for process control, new simplified model approaches including resolution routines are needed. Thus the research work is focused on the design and development of an analytical spray model that allows for sufficient accuracy (reasonable simplifications will be developed), runs with a minimum of computing power and allows for handling of predefined boundary conditions like geometry, nozzle, etc..

Within the project the ITC is responsible for the experimental investigation of the atomization process using gas assisted twin fluid atomizers. The investigations will be performed in model and pilot scale (using atomizers provided by the industrial partners) at varying operating conditions. Spray quality will be evaluated by the resulting drop size as well as by the morphology of primary jet breakup.

The project aims for the development of an adaptable, semi analytical calculation tool for the characterization of the thermodynamic and reaction behavior of sprays for design of chemical engineering processes.

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