ADVANCED SPRAY ENGINEERING SERVICES

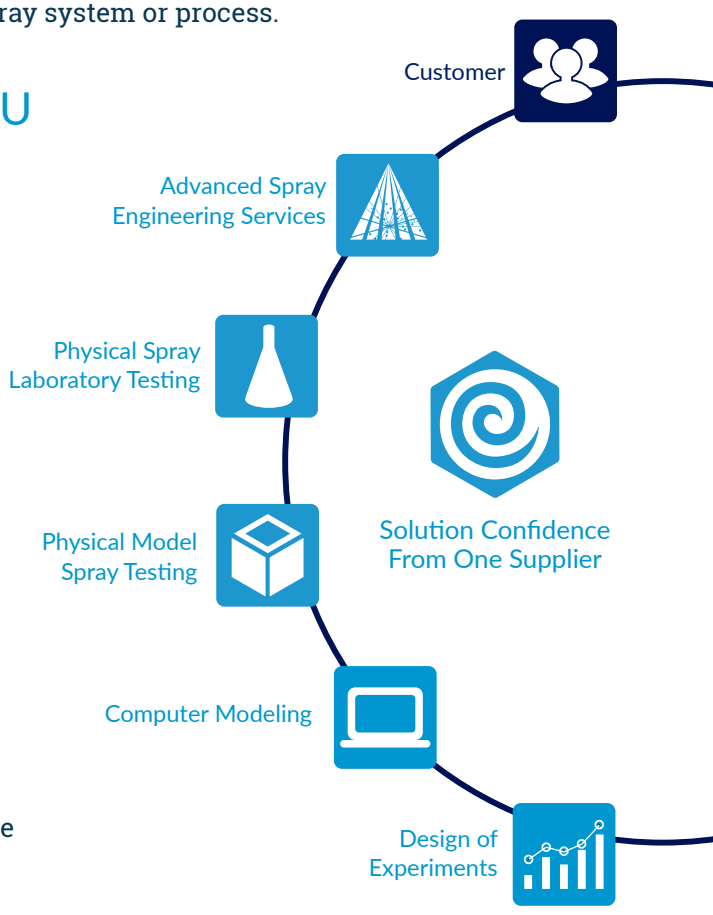
Ensuring Solution Confidence

OPTIMIZE YOUR SPRAY PERFORMANCE WITH RESEARCH, TESTING, AND MODELING

Understanding nozzle performance and how a spray behaves in your process is critical. When information in our catalog is not enough, BETE's resources and experience can help you with nozzle selection, solving existing spray problems, or designing a new spray system or process.

WHAT OUR SERVICES CAN DO FOR YOU

Advanced Spray Engineering Services works with all of BETE's resources, including manufacturing and fabrication, to help you design your process or solve your spray problem. We collaborate with our manufacturing and design engineering teams throughout the analysis process to ensure that the result is manufacturable and cost-effective.



LET'S GET STARTED

An engineering services project begins with thoroughly understanding the process objectives, problems, and constraints. We will then typically issue a concept work proposal for you to review. Actual work may proceed in several phases.

Learn how our services can improve your spray process, minimize waste, benefit operations, and promote sustainability.

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PHYSICAL SPRAY LABORATORY TESTING

SPRAY AREAS

- The large indoor spraying area is 50 ft x 30 ft x 22 ft (15 m x 9.0 m x 6.5 m) high.
- Pumping capacity allows for 1800 gal/min (7000 l/min) at low to moderate pressures and can pump up to 40 gal/min @ 1740 psi (150 l/min @ 120 bar).
- A spacious outdoor area accommodates testing for wind drift or the throw of large sprays.

Spraying Alternative Fluids

We accommodate testing with non-toxic, non-hazardous liquids. If a liquid is hazardous or expensive, it is possible to use an analog with similar properties.

SPRAY PATTERN ANALYSIS

Patternator

The patternator collects sprays in a row of tubes over a specified time to determine the liquid distribution of the spray. Measuring liquid distribution is a valuable tool for optimizing the design of nozzles and nozzle arrangements.

DROPLET SIZE ANALYSIS

The size of droplets in a nozzle's spray often affect process performance. BETE has two instruments to measure the droplet sizes each nozzle produces.

Imaging Particle Analyzer

A strobe light combined with a video camera takes images of droplets. Custom image processing software sums the pixels of each droplet in the image and applies a scale factor to calculate the true size. Helpful in measuring large, non-round droplets and capable of measuring 25 µm to 20 000 µm in diameter.

Phase-Doppler Particle Analyzer

Uses light interference in two laser beams to measure droplet size and droplet velocity in two planes. It is beneficial for measuring droplets in the 1 µm to 5000 µm range.

COMPUTER MODELING

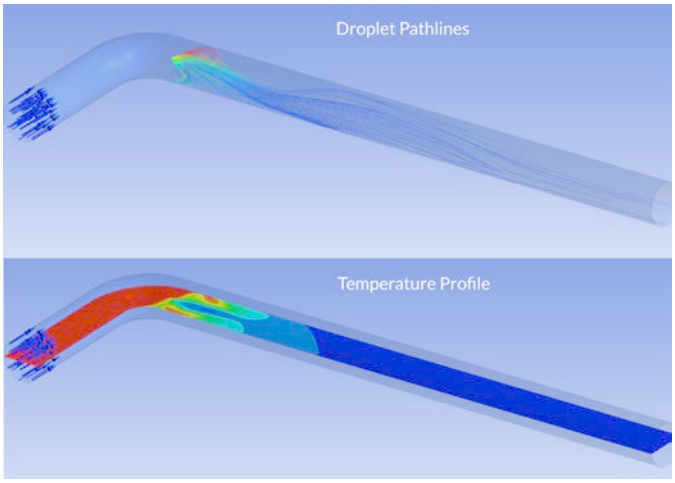
COMPUTATIONAL FLUID DYNAMICS (CFD)

Benefit From Using CFD Simulation to Optimize Your Process Before You Build It

CFD software, coupled with actual spray performance data captured in our laboratory, models a wide variety of systems to predict distribution, velocity, temperature, flow paths, droplet evaporation, wall hit, and almost any physical quantity.

Typical CFD Simulations

- Fluid flow inside nozzles and piping
- Evaporation of sprays and cooling of gases
- Mixing inside of tanks and vessels



PHYSICAL MODEL TESTING

BETE can design, fabricate, and operate large-scale physical mock-ups. All work is performed at the same facility, ensuring close coordination to meet mechanical and performance requirements through each phase of the process.

Common Examples

- Study of erosion patterns in fluidized beds
- Mixing of gas in a pipeline
- Seal leak tests to ASTM A515 using helium
- Life-cycle testing
- Pressure vessel strain gauge testing
- Hydrostatic testing

DESIGN OF EXPERIMENTS

Design of Experiments is a methodology to plan experiments that extract the most information from the smallest number of tests. BETE uses JMP® software from SAS to assist in designing experiments and analyzing the resulting data.