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Summer 2002

AIRFLOW SCIENCES CORPORATION

# The Airflow Update

## ASC Solutions to Food Industry Challenges

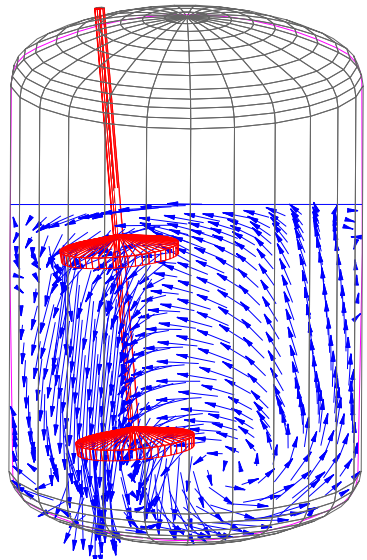
One of the advantages offered by Airflow Sciences Corporation (ASC) is the wide variety of industries which can be aided using its expertise in fluid flow and heat transfer. Often the insights gained in one industry allow for innovative improvements in another.

In this issue of the Update, we focus on uses of

our numerical simulation and experimental skills in support of the food industry. The three case studies shown below are a selection of those we displayed in our booth at the recent IFT Food Expo in Anaheim, CA.

Even if you work in a totally different industry, you may find some of the approaches apply to your situation.

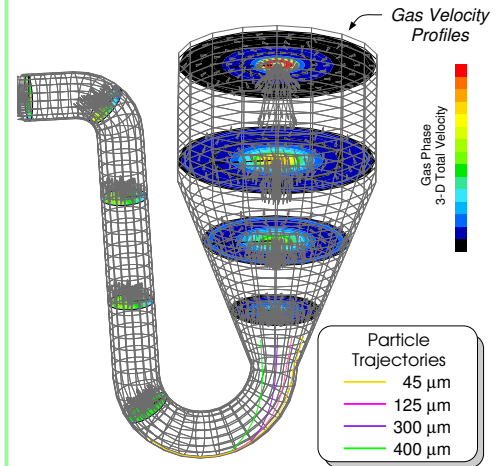
### MIXER SIMULATION



*Motion of liquid in a pitched blade impeller tank*

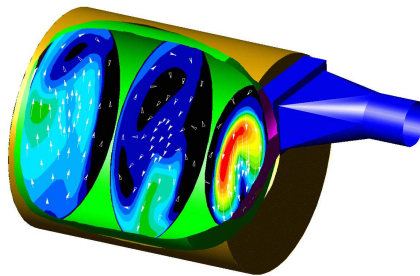
Mixing of biological materials presents unique challenges. ASC's tools can help improve mixing performance without exceeding shear limits.

### SPRAY DRYER SIMULATION



Spray Dryers operate by injecting a slurry into a hot gas stream, and relying on evaporation to produce a dried powder. ASC can simulate the gas motion, droplet trajectories, and droplet drying in order to solve your spray dryer problems.

### ROASTER SIMULATION



*Gas Velocity Profiles*

Simulation of roasters can include not only gas flow calculations, but also convective, conductive, and radiative heat transfer, temperature and moisture profiles within the product, and models of volatilization and chemical processes. Using such a model, a manufacturer can improve quality, reduce product variations, and increase throughput.

For further information about ASC's experience in the food industry, visit our website at:

[www.airflowsciences.com](http://www.airflowsciences.com)

### From the Editor

When you deal with an engineering firm, do you prefer your solutions being undertaken by licensed professional engineers? Airflow Sciences Corporation is pleased to announce that 50% of our engineers are licensed in at least one jurisdiction. Now, our licensed engineers span two countries! Congratulations are extended to Kevin Linfield, Ph.D., P.Eng., on obtaining his professional engineering license in Ontario, Canada.

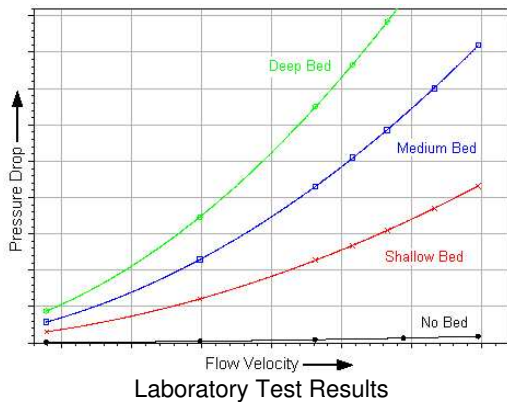
Since ASC's first power project over 20 years ago, we have been proud of our work helping companies reduce pollution. That is one of the reasons that we have joined the Institute of Clean Air Companies (ICAC). The ICAC is a non-profit national association of companies that supply air pollution monitoring and control systems, equipment, and services. ICAC members develop guidelines to assist industry in the procurement and optimization of pollution control equipment. If you would like to learn more about how we can apply our skills and knowledge to reduce pollution in almost any situation, please contact us.

If you have any flow, heat transfer, mixing, combustion, or mass transfer issues you're dealing with, feel free to give us a call at (734) 525-0300.

# Physical and Laboratory Modeling

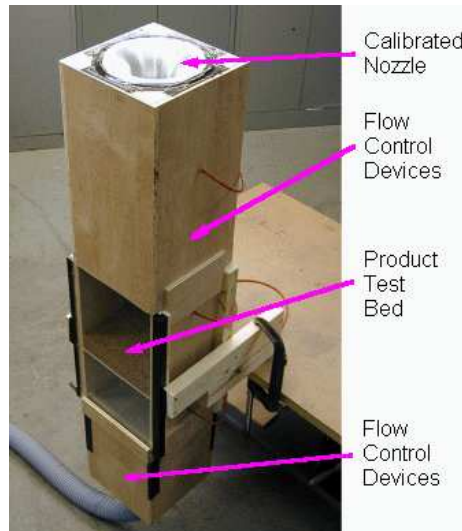
Some people associate Airflow Sciences Corporation only with CFD modeling. But over 40% of our work involves physical modeling, field testing, or laboratory work. This aspect of ASC allows us to assess equipment performance in a controlled environment, perform specific research to improve a process or product, and develop prototype equipment. Physical models also provide input values and correlation data for our CFD models.

Our laboratory features wind tunnels, fans, a wide range of instrumentation, and a complete fabrication shop for model construction. We maintain our own subsonic windtunnel (with a 860mm x 430mm test section) for external air flow analyses (golf balls, measurement probes, etc). ASC fabricates physical flow models of various industrial equipment to analyze internal flows and develop design improvements. This includes pollution control devices (ESPs, fabric filters, and cyclones), combustion systems (windboxes, burners, coal pipes, and ducts), thermal processes (auto engine parts, vehicle seats, and transmission gears), and HVAC systems.



For some projects, our lab testing capabilities help support our CFD simulations. For example, the modeling of a piece of processing equipment will often involve flow through a product bed. For best accuracy, the simulation model should include an accurate representation of the flow resistance provided by that product bed. In the figures below, a custom test fixture was constructed to measure the pressure drop associated with various product depths in a food product dryer. The results of this test were used as input parameters for a large-scale CFD model which optimized drying efficiency.

Does your facility require physical modeling or laboratory work? Give us a call and we'd be glad to help you analyze your situation.



Custom Test Fixture

## Contacting ASC:

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## Airflow Events

Keeping in tune with our industry clientele, we've recently participated at Power-Gen 2001, Electric Power 2002, and the Institute of Food Technologists (IFT) Food Expo. We hope to see you at future trade show exhibitions, including:

- ASM Material Solutions and Surface Engineering Exposition (Oct 8-9, Columbus OH),
- ESP/Fabric Filter Roundtable (Aug 11-13, Dallas, TX), and
- Power-Gen 2002 (Dec 10-12, Orlando, FL).

Note that we are presenting a paper at Power-Gen, and our own Rob Mudry is conducting a technical seminar at the ESP/FF roundtable.

In the meantime, if you are facing flow, heat transfer, or mass transfer issues, please give us a call.



**Airflow Sciences Corporation**

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