



LIGHTNIN Consulting Services

LIGHTNIN has long supported the need of providing full service mixing support to our valued customers. In today's business environment of "doing more with less," local resources at your operation have been stretched or eliminated. At LIGHTNIN, we recognized this and have increased the level of process support available to our customers. Evaluation and resolution of our customer's mixing issues has been a core strength for many years at LIGHTNIN.

You can leverage the resources and knowledge base of LIGHTNIN by optimizing your mixing processes and solving any mixing problems. LIGHTNIN's Process Technology Lab enables this support to be efficiently executed to minimize your costs. LIGHTNIN will evaluate your existing mixer design and process goals to determine opportunities for improvement. LIGHTNIN will team with your technical group to reduce the time and expense for developing new mixing applications. LIGHTNIN can assist in the specification of mixer design, tank internals, feed stream locations and product draw-off position to optimize your operation. LIGHTNIN

has extensive experience in scaling up lab designs and achieving guaranteed full-scale performance.

LIGHTNIN's consulting work starts with a discussion of your needs and process information. Then a proposal is created to define the project scope, responsibilities, deliverables, cost and schedule. A path forward is then concisely and clearly written, and agreed to by both parties. Bi-directional confidentiality agreements are frequently a necessary and common course for doing business.

TABLE OF SUPPORT SERVICES

| PROCESS | CAPABILITIES | SUPPORT EQUIPMENT |
|--|---|---|
| <ul style="list-style-type: none"> ▪ Solids suspension analysis and optimization ▪ Mass Transfer analysis and optimization ▪ Blending analysis and optimization ▪ G/L Reaction Improvement ▪ Heat Transfer Improvement ▪ Mechanical Troubleshooting ▪ Process Troubleshooting ▪ Process Capability Development <ul style="list-style-type: none"> - Audit of your mixing systems and report on how to improve ▪ Scale-up and Scale-down expertise | <ul style="list-style-type: none"> ▪ Lab dedicated Fabrication Facility ▪ Solids suspension with particle size distribution measurement ▪ Mass Transfer rates by DO measurement ▪ Flow visualization with dye/pH indicators ▪ Conductivity probes with high speed data acquisition for quantitative blending analysis ▪ High Viscosity Solution preps ▪ Fluid force measurements with high speed data acquisition ▪ Advanced CFD Modeling | <ul style="list-style-type: none"> ▪ 80 foot diameter tank ▪ 50 foot by 50 foot tank ▪ Fully instrumented 8 ft. and 10 ft. diameter tanks; 9" to 48" acrylic and stainless tanks ▪ Large impeller inventory ▪ Torque measurement on mixer shaft ▪ Video Recording ▪ Microtrac Particle Analyzer ▪ Auto moisture analyzer ▪ Doppler Laser Velocimeter Lab ▪ Solvent Rated Lab (XP) |

Maximum Flexibility - Three Ways To Test For The Best

As the world's premier mixing expert, we serve a tremendous variety of industries and applications - everything from pharmaceuticals to minerals extraction operations. And the testing involved with each of these applications is just as diverse. Flexibility is key. That's why we specifically designed the lab to accommodate a broad range of tests.

1 We'll test your actual materials.

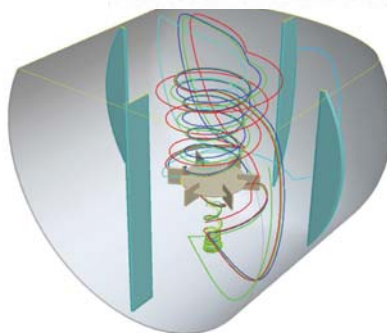
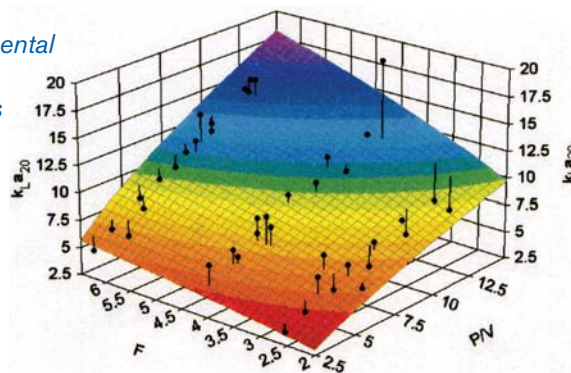
We'll perform a variety of scaled-down tests using your actual materials. No matter what your mixing process is - gas dispersion, slurry suspension, paper stock agitation, blending, or nearly anything else - we'll analyze it for optimal flow and shear. That's the best way to find out in advance which impeller will maximize not only mixing, but also the process itself. If your materials are hazardous, we'll run tests in the lab's Explosion-Proof Testing Area.

2 We'll test an acceptable facsimile of your material.

While actual materials testing is preferable to ensure optimum mixing performance, we realize it isn't always possible. So, at the LIGHTNIN Process Technology Lab we offer a number of options for materials and process simulation, or computational fluid dynamics (CFD) modeling. We also conduct tests in water to measure mass transfer coefficients and flow/shear ratios and then scale to your process.

3 We'll run full-scale performance tests for you - on- or off-site. If your application demands it, LIGHTNIN provides scale-up testing capabilities in our 600,000-gallon tanks. Or, if necessary, we'll come to your location for full-scale testing to determine the best configuration for your process.

Experimental Data Analysis



Three Dimensional CFD



Bernie Gigas, PE

Bernie joined LIGHTNIN in 1994 and currently manages the R&D Engineering functions at LIGHTNIN. Since 2000 he has focused on chemical process optimization and troubleshooting. Areas of expertise in fluid processing cover gas-liquid mass transfer and Computational Fluid Dynamics. He holds a BS in Chemical Engineering (University of Rochester), an MS in Mechanical Engineering (RIT), and is a

registered Professional Engineer in the State of New York.

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Kevin Logsdon

Kevin joined LIGHTNIN in 2005 as a Research Consulting Engineer to manage LIGHTNIN's Pilot Facilities used in providing data based solutions to customer mix problems. Experience includes 24 years of Chemical Process Development and Senior Process Engineering support. He holds a BS in Chemistry (State University of NY at Brockport) and MS in Chemical Engineering (University of Virginia).

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For more information about our worldwide locations, approvals, certifications, and local representatives, please visit www.spxpe.com.

SPX Corporation reserves the right to incorporate our latest design and material changes without notice or obligation.

Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing. Certified drawings are available upon request.

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PROCESS EQUIPMENT