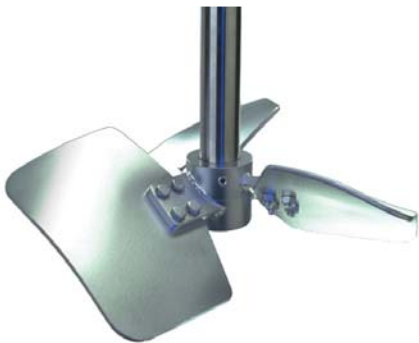




Personal Care and Home Care

LIGHTNIN MIXERS AND IMPELLERS



A World Leader in Industrial Mixing since 1923, Lightnin has 90 years of unrivaled experience in industrial mixing technology, process knowledge, and technological innovation.

Lightnin enjoys a global reputation for durable, long-lasting mixers, agitators, aerators, and flocculators for fluid process systems. We offer a full spectrum of impeller designs for diverse applications. In addition, we offer a worldwide service network, mixer repair, gearbox repair, and replacement parts programs. Look to Lightnin for knowledge, technology, and service excellence.

Based in Charlotte, North Carolina, SPX Corporation (NYSE: SPW) is a global, multi-industry manufacturing leader with approximately \$5 billion in annual revenue, operations in more than 35 countries and over 14,000 employees. The company's highly-specialized, engineered products and technologies are concentrated in Flow Technology and energy infrastructure. Many of SPX's innovative solutions are playing a role in helping to meet rising global demand for electricity and processed foods and beverages, particularly in emerging markets. The company's products include food processing systems for the food and beverage industry, critical Flow components for oil and gas processing, power transformers for utility companies, and cooling systems for power plants. For more information, please visit www.spx.com.

Lightnin Mixers

FOR YOUR PERSONAL AND HOME CARE PRODUCTS NEEDS

The Personal Care & Home Care market sector covers a wide range of products. Oral, personal cleansing, beauty and hair care products are covered in Personal Care. Home Care products include detergents, surface and lavatory cleaners, facial and household tissues, sanitary protection and diapers.

Our Lightnin brand mixing equipment has been delivering high quality and high value for our customers for over 90 years.



QUALITY - ASSURED

Our Mixing equipment offers you the essential characteristics you need to manufacture your Personal and Home Care products repeatedly and to the highest quality.

Engineered to meet your needs, we can offer:

- Crevice free design to allow clean-in-place (CIP) services
- Highly polished surfaces typically 0.5 μ m Ra (20 μ m Ra) or better and electro-polishing where needed
- Self-draining surfaces
- Hygienic mechanical seal designs with FDA materials
- Material Certification and Quality Assurance Documentation
- Accurate fixed or variable speed drives with shaft speed monitoring



PROCESS AND TECHNOLOGY

We can match our many years of experience in mixing technology to the rheology of your product to ensure you obtain your process needs.



Select SPX mixing equipment and you get more than an efficient and cost effective process. You get over 90 years of experience in superior processing technology. We were one of the first to use computational fluid dynamics (CFD). This experience has enabled us to design and develop products specifically for high viscosity and varying rheology mixing into the 21st century.

Our laboratory is a standard for the business, and allows us to optimize your process, from pilot to full-scale testing. Your benefits are higher reliability, lower production costs, greater output, resulting in improved profits.

Lightnin...When Mixing Matters.

Application Knowledge

SPX has a process solution for a wide variety of mixing applications. Mixing applications can be broken down into the following mixing duties: liquid-liquid, liquid-solid, gas-liquid, gas-liquid-solid and fluid motion. Many applications are often a combination of these duties and thus having a full understanding of each of these areas is crucial to recommending an optimized design that is also economical.

liquid-liquid

- Continuous pH control
- Blending of additives and ingredients in personal and home care products
- SLES (Sodium lauryl ether sulphate) Production
- SMES (Sodium myreth sulphate) Production



liquid-solid

- Blending of additives and ingredients in food and beverages



gas-liquid

- Hydrogenation for chemical and pharmaceutical Industries



fluid motion

- Homogenization of storage tanks





ENHANCED FEATURES FOR IMPROVED PRODUCTION PROCESSES

To meet the need for cleanliness in reducing the sites where bacterial action can initiate, many features can routinely be added in to the design of our Lightnin mixers. Such features include:

- Polished shaft, impellers, flanges and seal areas to reduce the hang-up of product on wetted parts. This can be combined with electro-polish if required.
- Crevice-free designs that eliminate 'bug traps' from interface points .
- Self-draining features on wetted parts on top and bottom surfaces. This assists the prevention of product hang-up on the wetted parts and also assists with Clean-in-Place (CIP) systems.
- Sanitary and easy clean mechanical seals that can be provided to meet FDA material requirements for faces and elastomers. By paying careful attention to the seal area improvements to CIP regimes can be made. Mechanical seals can also be provided with a debris well to capture any seal face wear product, this when combined with appropriate CIP regimes can enhance seal cleaning.
- Special impeller coupling designs can provide cleanable impellers that can be adjusted on the shaft. Being able to adjust the impeller up or down on the shaft can be an important feature for pilot plants and on universal systems for production.

KNOWLEDGEABLE ABOUT YOUR NEEDS

Personal & Home Care Products require a high degree of process understanding to achieve optimized results. Understanding and optimizing the results is one part of the production needs; it is also essential to understand the operational requirements of the production or pilot plant to ensure the product being produced meets the expectations of consumers.

At SPX we understand the production needs of the equipment that serves these markets. We offer hygienic clean designs that meet the current good manufacturing practices (cGMP) for the food industry, Personal Care, Home Care all the way through to the exacting demands of the Pharmaceutical and Bio-science industries including FDA and ASME BPE conformance. We can offer a solution that meets your production needs while offering the most economical solutions.

Matching our process and product knowledge with your requirements, we are also able to provide you with the Quality Assurance Documentation (QAD) that you need to support your processes and validation requirements. Depending on the product and the level of documentation required for production, we can offer an economic document package or we can tailor the QAD package to meet your validation needs.

Documentation that can be offered includes:

- Material Conformity Certification
- Food Grade, Polish and Passivation Certification
- Weld Procedures and Qualification to required Codes
- FDA Compliance

Other forms of documentation are available.

UNIVERSAL BLENDING EQUIPMENT

By combining our mixing technologies we are able to provide the correct mixers to support Universal Blending Systems. By combining our open impellers (A310/ A510, A320 or A200) with a slow speed anchor (R400) we can help you blend, mix and have shear control in a range of product rheology allowing you to have a versatile system to accommodate many production or pilot plant needs.

Many applications in the Personal and Home Care Products require control of blending and shear as the product develops in the vessel. Changing viscosity, ranging from low to high and reducing again to achieve the final product is common place, and with varying specific gravity controllable impeller performance is required. Our SPX Lightnin brand impellers are developed in our test facilities to ensure accuracy and repeatable performance characteristics.



CONSULTING SERVICES

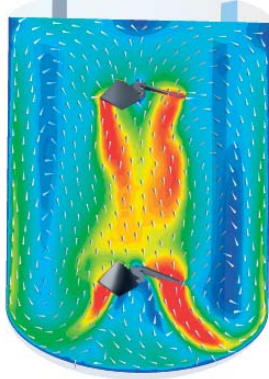
SPX's Lightnin brand has long supported the need of providing full service mixing support to our valued customers. In today's business environment of "doing more with less," local resources at your operation have been stretched or eliminated. At SPX, we recognized this and have increased the level of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



You can leverage the resources and knowledge base of Lightnin by optimizing your mixing processes and solving any mixing problems. Lightnin's Process Technology Laboratory enables this support to be efficiently executed to minimize your costs.

Lightnin's team 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's experts 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.



3 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 to success. 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.

2. We'll test an acceptable simulant 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 Laboratory we offer a number of options for materials and process simulation, or computational fluid dynamics (CFD) modelling. 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 test tanks. Or, if necessary, we'll come to your location for full-scale testing to determine the best configuration for your actual process.

Reliability By Design

SPX understands that when it comes to efficient process plant operations, equipment reliability is of paramount importance. As a long-standing member of AGMA (American Gear Manufacturers Association) SPX's Lightning brand recognizes that multi-purpose commercial gearboxes are poorly suited to Agitator service. For more than 50 years the Lightning products have utilized proprietary, purpose designed agitator gear drives to ensure dependability and lowest cost of ownership. SPX's agitator drive designs are continually evolving to take advantage of latest materials technologies and manufacturing techniques.



Series 45 Inline Mixers

Inliners are near plug flow devices, and can provide significant advantages in many continuous mixing applications.

- An inliner in turbulent flow ensures a rapid blend time, and removes the risk of stratification that can occur if mixing is left to natural turbulence alone
- Ideal choice for continuous blending, dosing sampling systems, difficult mixing duties and many other applications
- Removable, cleanable mixing elements and hygienic couplings are available

ECL Mixers

ECL Mixers provide high performance and enhanced process results.

- A mixer duty motor with standard mounting allows for many speed and enclosure variations
- Large output shaft bearings for longer allowable shaft lengths and long life - ideal for flash mixing
- Available in 0.25 kW - 4 kW (0.3 - 5 hp) with speeds up to 1800 rpm

Nettco S-Series Mixers

The S-Series Mixers are designed for a wide range of mixing duties for sanitary applications.

- 304SS housing
- Stainless Steel washdown (IP55) motor, Inverter ready
- Food grade lubricant
- Wide range of mounting options including clamps, seals and more
- Choice of impellers: Hydrofoil, PBT, Marine Prop.
- Available in 0.37 kW – 2.2 kW (0.5-3 hp) with speeds up to 1800 rpm

Series 10 Mixers

The Series 10 delivers a superior combination of value and performance.

- Exceptional durability - long gear and bearing life
- Fewer moving parts simplifies maintenance
- Unique output shaft connection
- Ideally suited for mixing in medium to large continuous or batch processes
- Available in 0.75 kW - 22.5 kW (1 - 30 hp) with speeds from 9 rpm with double - 125 rpm

Series 70/80 Mixers

Our most specified series of mixers; an industrially tested and mechanically proven design. The 70/80 Series mixers are ideal for a wide range of applications.

- Bearings are sized far beyond AGMA requirements for minimum maintenance and long service life
- Helical change gears are easy to replace to meet new or changing processing requirements
- Available in 0.75 kW - 110 kW (1 - 150 hp) with speeds from 11 to 280 rpm

Impeller Technology for Personal and Home Care Products

Lightnin has a full range of impellers for each mixing step of the process. We match our impellers to the specific duty accomplishing optimized and guaranteed results. Our impellers can be used in combination to allow multifunctional processes in production and pilot plants.

A200

Recommended for low to medium viscosity blending and solids suspension applications:

- Classic 45 degree pitch bladed turbine (PBT) design
- Although replaced by the A510, this impeller still is applicable in cases where some fluid shear is required (e.g. solids make down and viscous applications)
- Can be customized with varying blade widths and blade angles and with 2, 4, or 6 blades (A201)
- Hygienic bolted construction is available for tanks with small diameter manways

A310/A510

Low blade solidity hydrofoil, recommended for low viscosity blending and solid suspension applications:

- Varying tip chord angle allows for further optimization of mixer selection
- Maximizes flow generation while minimizing fluid shear
- The A310 is standard for all Lightnin gear drive portable mixers
- Generates the same flow as a pitched bladed turbine (A200) for 60% of the power and 50% of the torque
- Hygienic bolted construction is available for tanks with small diameter manways

A320

High solidity hydrofoil design recommended for high viscosity blending applications:

- High efficiency wide bladed impeller design with high flow/power ratio
- Improved axial flow at low Reynolds numbers ($N_{re} < 500$) reduces power requirements up to 50% over a pitch bladed turbine (A200) for equal blending performance
- Has also been successfully used for gas handling applications
- Hygienic bolted construction is available for tanks with small diameter manways

A620

Recommended for non-Newtonian transitional flow blending, where Reynolds number is Re 50 to 500:

- Optimal two bladed design creates down flow in the center and up flow at the wall, creating a complete turnover of tank's contents
- Provides similar blend time for less power than traditional open impellers (A320, A200) and less torque (lower cost) than traditional close clearance impellers (A400, R400)
- Operates at high impeller diameter/tank diameter ratios, which improves heat transfer at the wall
- Hygienic bolted construction is available for tanks with small diameter manways

A400

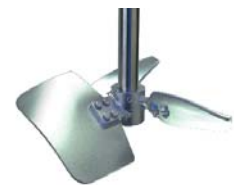
Recommended for ultra-high viscosity blending applications at low Reynolds number (Re < 10):

- Includes a set of both inner and outer blades, with the inner pumping down and the outer pumping up, creating a complete turnover of the tank's contents
- Close clearance operation to tank wall improves heat transfer on jacketed vessels over open style impellers such as pitch bladed turbines (A200) or wide bladed hydrofoils (A320)
- Hygienic bolted construction is available for tanks with small diameter manways

R400

Traditional anchor style wiper impeller recommended for ultra-high viscosity blending applications at low Reynolds number (Re < 10):

- Optional tank wall scrapers can be fitted to prevent the build up of caking materials
- Hygienic bolted construction is available for tanks with small diameter manways



Lightnin Mixers and Impellers

PERSONAL CARE AND
HOME CARE



Global locations

AMERICAS

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For other Sales locations click
www.lightninmixers.com/contacts/where-to-buy/
or use your SmartPhone and the QR Code



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