Cleaner Answers to Your FGD System

PEOPLE, PROCESS, PRODUCTS, PERFORMANCE GUARANTEED

Philadelphia Mixing Solutions, Ltd. has extensive experience with the intricacies of specific applications and solving their challenges along with advanced process knowledge, allowing us to offer unmatched and optimized solutions.

Global FGD Installations by Philadelphia Mixing Solutions, Ltd.

Whether you are looking to upgrade or begin your FGD application, call Philadelphia Mixing Solutions, Ltd. and let us apply our expertise to your project.

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Excellence by tradition, optimization by design.

Over 100 Years of Process and Mechanical Reliability

Flue Gas Desulfurization
Agitation & Oxidation

Limestone Slurry, Gypsum Slurry, Absorber Oxidation, Sump Systems, Ash Recycle Slurry, Ball Mill Makeup Slurry, FGD Wastewater Treatment
Get the Right FGD Process Solution
Partner with the industry expert that provides:

- EXPERIENCE, EXPERTISE, and PROVEN HISTORY of designing effective and reliable operations.

- GUARANTEE on mechanical components and OPTIMIZED process results.

- KNOWLEDGE of your Flue Gas Desulfurization process challenges.

- TOOLS to put you in CONTROL of your own process.

The RIGHT SOLUTIONS with the MOST OPTIONS to customize your SO₂ removal process.

Philadelphia Mixing Solutions, Ltd. is uniquely qualified to provide the complete package to ensure your clean air requirements with expertise in agitators and FGD technology.

For over 100 years, Philadelphia Mixing Solutions, Ltd. (PMSL) has led the industry in mechanical gearbox design. We have set the highest standards in agitating and FGD technology for the past 40 years. Our capabilities, experience, and expertise in mechanical and process optimization are unmatched. Reliable agitators is just one part of the winning solution. We also have the right people, the right training, and the right tools to maximize application knowledge.

Follow our story inside and watch for the ✔️ marks. You can track which capabilities are at work and why PMSL is the FGD PROCESS EXPERTS.

PMSL Services

Drive Exchange Program
Reduce downtime and lost production

With over 3,000 ways to say yes, we can help when your equipment fails. For service problems with ANY agitator drive, we are available 24/7 to get you back up and running.

Whatever brand agitator drive is, we have an answer. If the exact item is not available, we can quickly plan design an adaptor plate to marry an appropriately sized agitator drive to the base.

Plan ahead for predictive and preventive maintenance by having a spare drive on site ready for install. We can meet your needs to keep you operating smoothly. You can be confident with your replacement agitator drive with the protection and security of a 3-year warranty.

Inspect & Repair Program
True Root Cause Failure Analysis

We provide the most comprehensive analysis and repair for all agitator drives, regardless of brand. Inspect & Repair goes beyond treating symptoms to identifying the true root cause of failure to fix the problem.

Thorough cleaning, inspection, and validation of all parts is conducted and you are provided with a detailed report including digital photographs and repair options.

Your agitator drive is rebuilt to its original OEM specifications in better than new condition. You get the protection and security of a 3-year warranty - three times the industry standard.
The Phoenix™ System
High Quality, Reliable Agitator Drives at the heart of the system

Our Agitator drives are designed to withstand harsh and corrosive environments. Gears are precision ground to AGMA standards. Bearings provide minimum L-10 life of 100,000 hours.

The Raven™ 3850M Agitator Drive
• Handle overhung and fluctuating loads.
• Unique drywells and endplate covers eliminate oil leakage and vibration.
• Reduced gear deflections.
• Can be mounted as a top or side entry agitator.

The Cutlass™ Agitator Drive
• Reliable and quiet operation with Goodyear Eagle Pd Belt Drive.
• The most concentrated jet stream available with our exclusive Lancer™ Prop.
• Tank shut-off device with metal-to-metal seat faces for positive seal during change outs.
• Pre-lubricated, sealed bearings.

The PVE Agitator Drive
• Handles dynamic loading during operation.
• Unique drywells eliminate oil leakage.
• Large diameter output shafts reduce gear deflections without steady bearing.

The UniFirst™ 4040 Agitator Drive
• Quiet and reliable operation.
• Unique drywells cast into housing eliminates leakage.
• Versatile gear ratio change with single change of high speed pinion.

The PV2 Agitator Drive
• Agitates 500 - 15,000 gallon sump applications.
• Utilizes the most advanced hydrofoil batch impellers for solids suspension.
• Handles dynamic loading during operation.
• Multiple seal and mount options are available.

The Phoenix™ System from Philadelphia Mixing Solutions (PMSL)
Proven Performance, Reliable Results, Economical Operations

The Phoenix System is the result of time-tested operational installations of Flue Gas Desulfurization (FGD) process. Using the latest technology coupled with our application experience, this approach provides a greater process-oriented solution than simply re-deploying outdated equipment to new tasks.

• Lab proven (½ - ¼ scale) oxidation performance levels.
• Improved oxidation of calcium sulphite - proven in over 150 coal-fired power plant installations.
• Increased effectiveness and operating flexibility.
• More control to ensure longer component life.
• Lower maintenance with ease of operation.

PHOENIX SYSTEMS Mechanical and Absorber Process Guarantee is the reliable solution!
The AirWing™
The Best Air Delivery System

Unique, patented airfoil design optimizes the jetstream created by the impeller thrust

90° “Elbow” feature allows air to depart wing on horizontal axis prior to hitting jetstream

The AirWing® mass transfer coefficient exceeds the Lance™ design by up to 30% in large scale side-by-side testing. The unique, patented airfoil design optimizes flow by requiring less air to accomplish FGD requirements...saving blower power and money!

Patented exhaust port designed through CFD, FEA, and lab testing

Advanced Treatment Technology
Superior Gas Flue Desulfurization Technology

Clean Air regulations require power plants to reduce pollutant emissions. By retrofitting coal-fired facilities with complex flue gas desulfurization systems, power companies can lower SO₂ emissions by 98%.

The absorber tower is the core of any wet flue gas scrubber system. The actual chemistry and mechanical layout of the absorber is specific to the individual scrubber system supplier. However, one thing common to all second generation wet limestone FGD processes is the forced oxidation of Sulfite (SO₃²⁻) and Bisulfite (HSO₃⁻) ions to Sulfate (SO₄²⁻) ions. Once the sulfate ions combine with the limestone’s Calcium (Ca²⁺) ions, the resulting crystallization produces a commercial grade gypsum. This byproduct eliminates landfill problems associated with the older Calcium Sulfite process.

The process must be constantly monitored and adjusted to maintain pH value, temperature, slurry concentration and flow rates. It is critical that the desulfurization and oxidation process is not interrupted due to the failure of the mechanical equipment or controls. An interruption could lead to a malfunction and the release of damaging SO₂ through the stack.

PMSL knows your process and understands your challenges.

Equipment reliability is core of our success with FGD applications. With over 150 installations and 40 years of field proven reliability, we have the application knowledge and expertise to optimize your FGD treatment process. We have earned our reputation for reliability, service, and support, even in the most are what you need... PMSL has built its reputation on providing the most reliable equipment to some of demanding applications.

Our Philly “On-Call,” support service offering 24/7 technical assistance and support, helping you with:

- **Reduced Downtime:** Downtime means the emissions are not meeting the “clean air” requirements and that can mean significant fines if the situation is not resolved quickly. Philadelphia Mixing Solutions, Ltd. is your go-to expert that offers options to put you back in business fast.

- **Maintenance:** When Properly maintained your equipment can last for generations with minor preventative service. Our trained application engineers work with you to develop a predictive and preventative schedule for your critical operation agitators.

- **Process Support:** Philadelphia Mixing Solutions, Ltd. is the only domestic company with experience and expertise in FGD to offer Absorber and Mechanical Guarantees. We give you options for upgrade and solutions to slowdowns.

Talk with our trained technicians and get answers, solutions, and peace of mind that only comes from operational equipment.”

“The care and balance of the FGD scrubber system is the key to keeping our treatment levels at their best. We needed someone to help us find the right technology to improve our process - PMSL was the right choice.”
Research & Development Laboratory
Making the Unknowns - Known

Philadelphia Mixing Solutions, Ltd. operates the largest, most comprehensive, full service industrial mixer laboratory in the world, including a 750,000 gallon test tank. In our R&D Lab we have the ability to model, design, test, and evaluate agitator configurations from scale model to full scale to meet your specific needs.

Make unknowns known without risk and remove any doubt. Using cutting edge technology and equipment we can accurately test and compare competing FGD solutions side by side.

- **Analyze** solutions before they are installed in your facility.
- **Optimize** your process, maximize your profit, reduce chance of fines.
- **Eliminate** costly surprises, upset conditions, and “what ifs?”

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**Agitator Test Facility**

Shaft run-out test at bottom of 750,000 gallon test tank.

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**Comparative FGD impeller and O₂ delivery testing taking place.**

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**AirWing™ undergoing comparative testing in the world’s largest fluid mixing lab. Note the gap between impeller and air jetstream - no flooding is evident behind the impeller. This translates to less air required to fulfill your process.**

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The same cannot be said for the standard air delivery lance. Significant flooding is evident here, resulting in process failure.

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**Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD)**

Proven design.

Consistently outperforms the closest competitors’ offerings in actual lab tests.

Actual Test Data Analysis proves that AirWing™ is the superior solution by up to 30%!

Revolutionary design demonstrates Philadelphia Mixing Solutions, Ltd.’s application understanding and expertise. Agitator Drive & Impeller combo make the Phoenix™ System your smart choice!
Mechanical Advantages:
• Robust mechanical gearbox designs.
• Bearing life of 150,000 hours minimum L-10 based on motor nameplate horsepower.
• Case carburized and precision ground gearing built to AGMA specs for quiet and smooth operation.
• Splash oil and grease lubrication for reliable operation.

Process Advantages:
• Efficient dispersion of air into absorber with AirWing™.
• Complete suspension of solids to keep pump suctions clear.
• Make down and feed tanks solids suspension from “off bottom” to “uniform.”
• Maximized useful tank volume with special purpose agitator impellers designed to operate close to the tank floor.