



With over 60 years operating experience Plenty Mixers, an SPX FLOW Brand are acknowledged to be the market leader in the field of side entry mixing technology for the oil and petrochemical industries supplying major oil companies in over 60 countries around the world.

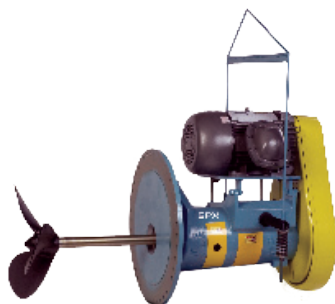
Plenty Side Entry Mixers have helped to set the industry international standard, outperforming other mixers on the market simply by virtue of their technically advanced design, which includes a simple and easily maintainable design, as well as a high efficiency, true helical pitch on piece 'cast' impeller incorporating high blade area and forward rake which was developed by Plenty.

SPX FLOW HEAVY DUTY SIDE ENTRY MIXERS

The Plenty Side Entry Mixer is an efficient converter of energy into fluid motion. Unlike jet mixer systems and do not suffer significant energy losses at the pump, in the pipework, in the bends, or most significantly, at the jet nozzles. Capital costs are low and access to in-tank components is not restricted, and the problem of frequent, urgent maintenance on tanks that must be emptied and cleaned is eliminated. Side Entry mixers are also efficient and are usually less expensive for larger diameter tanks and are ideal for use on tanks with floating roofs where practical considerations preclude the use of top entry mixers.

Standard Range:

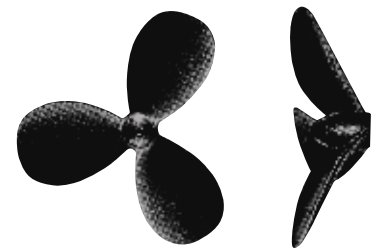
- 1.5 – 55kW (3 – 75 HP)
- Ø16" to Ø33" impellers
- Belt and Gear Drive
- Fixed and Swivel Angle



These four variables form the comprehensive standard range. A design concept to provide units suitable for long and continuous operation at remote sites with minimum maintenance.

IMPELLERS

Developed by Plenty for Side Entry Mixers, the high efficiency true helical pitch impeller with forward rake is a technically advanced design, having a large blade area that provides



the optimum cavitation-free suction conditions promoting maximum pumping rate and entrainment for any installed power. Each impeller is accurately cast as a one-piece component, thus eliminating the setting variances and welding problems often present with alternative fabricated designs. Rigid inspections of pitch, uniformity and balancing ensure minimal vibration and optimum pumping efficiency.

Advanced Impeller Design

- High Pumping
- High Thrust
- Minimum power draw
- Solid one-piece design
- Reliability
- Positive fixing and driving of the impellers on the shaft is achieved by the use of taper to taper shaft connection with side fitting key and retaining bolt.
- The mixer bearings in particular have been engineered to provide long life and to maximum bearing L10 Life.

TANK MOUNTING MANHOLE – FIXED AND SWIVEL

- The most common sizes of tank adaptor flanges to suit ANSI and API standard 24" and 30" are available as standard. Tank adaptor flanges can be supplied to suit all tank manhole/nozzle fixings.

GEAR DRIVEN MIXER

- Driven by a vertical electric motor which is flange mounted on the support bracket above the gearbox and connected by an all metal flexible coupling protected by a guard.

BELT DRIVEN MIXER

- A horizontal foot mounted motor is fitted above the main mixer frame on a steel mounting plate which allows adjustment for correct belt tensioning. Motor mounting plate hinges and belt adjustment screws are corrosion protected against atmospheric corrosion.

SHAFTS

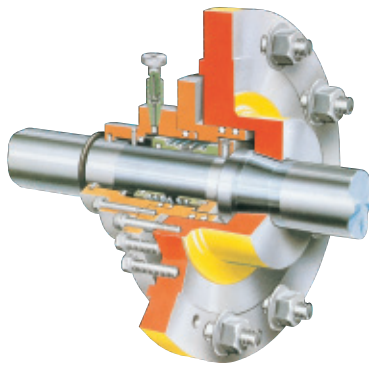
- Designed to minimize misalignment, deflection and vibration which all affect the mechanical seal and bearing life. A one-piece component with no intermediate couplings and is ground between centers at the bearing and seal areas. All shafts are hard-chrome plated in seal and shut off areas.

LEGISLATION REQUIREMENTS

- SPX FLOW Plenty Mixers are suitable for installation in costal environments all over the world. Regional legislative needs are met as standard, these include:
 - CE, ATEX (up to Category 2G IIc gases), OSHA & GOST

UNIQUE TANK SHUT-OFF DEVICE

All units incorporate a tank shut-off device to allow the shaft seal and bearings to be changed under full tank conditions. The tank shut-off mechanism incorporates tapered metal to metal faces, positively clamped by a bolted flange which both seals products in the tank and securely supports the shaft during bearing and/or shaft seal changes. The Plenty shut-off mechanism offers complete safety and security as it does not incorporate and flexible 'O' rings or gaskets which deform, wear or perish.



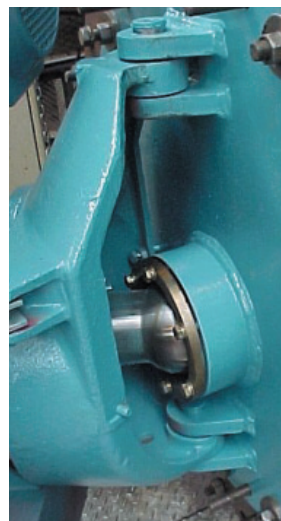
CRUDE OIL, BOTTOM SLUDGE AND WATER (BS&W)

The main purpose of the mixers in this application is to ensure the developed jet flow is used to lift the BS&W into the body of the crude oil to maintain a relatively clean tank floor.



55kW Swivel Gear Mixers installed with Automatic Actuator

Swivel Angle mixers incorporate a feature which allows the mixer angle of entry to be varied through 30° either side of the tank centreline in 10° increments and enable the entire tank floor to be directly scoured by the impeller flow stream. This is the only solution to BS&W control in large tanks and ensures that the heavy solids, water and corrosive salts which settle in areas least agitated by a permanently fixed mixer are maintained in suspension.



The mixer module is supported by two swivel hinge bearings which ensure ease of manual angle changing, the swivel seal is affected by a heavy duty static Solosel™ acting on a stainless steel spherical ball.

The Automatic Swivel Actuator is a shaft belt driven or an electric motor driven speed reducer and linkage, which allows the mixer to swivel 30° in either direction.

The timer controller provided will cycle on for even 24 hours and swivel the mixer 10° each time, allowing for efficient cleaning of the tank bottom and eliminates the need for routine manual adjustment.

Main Benefits:

- Tankage is always available for storage and not out of commission being cleaned or repaired
- Problems of sludge disposal are overcome
- No environmental problems
- Hazardous, dangerous and costly tank cleaning is practically eliminated
- Elimination of "plugged" water drains



SPX FLOW LIGHTNIN MIXERS

For over 90 years, Lightnin a premier brand of SPX FLOW, has been recognised as the leader in Mixing Technology. Their extensive knowledge base and dedication to continuous product development ensure efficient and reliable plant operations around the world. With our unsurpassed process application expertise, and state of the art analytical design tools we can solve virtually any mixing challenge no matter how complex.

Application Knowledge

SPX FLOW has a process solution for a wide variety of mixing applications. Mixing applications can be broken down in the following mixing duties:

Liquid-Liquid

- Solvent Extraction of Copper and other Metals
- Continuous pH control in potable water or effluent treatment
- Blending of additives and ingredients in food and beverages

Liquid-Solid

- Petroleum blending and drilling mud suspension
- Blending of additives and ingredients in food and beverages
- Draft Tube Crystallisers, und in the production of Alumina
- Suspension of Slurries in Large Tanks at Slurry Pipeline facilities

Gas-Liquid

- Flu-Gas Desulphurisation for municipal and industrial power plants
- Hydrogenation for chemical and pharmaceutical industries

Gas-Liquid-Solid

- Pressure Oxidation and High Pressure Acid Leach Autoclave Mixers
- Fermentation, a key process step in many Biopharma and Biofuel plants
- Surface Aeration and Anoxic Mixing Basins at Industrial and Municipal Water/Waste Water Treatment Plants

Fluid Motion

- Milk storage and Cream Aging for dairies
- Homogenisation of storage tanks

Many applications are often a combination of these duties. A full understanding of each of these areas is crucial to recommending an optimised design that is also economical.



RELIABILITY BY DESIGN

SPX FLOW 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 FLOW Lightnin brand recognises that multipurpose commercial gearboxes are poorly suited to Agitator service. For more than 50 years the Lightnin products have utilised proprietary, purpose designed agitator gear drives to ensure dependability and lowest cost of ownership. With more than 1 million units in the field our operating experience is unsurpassed.

SPX FLOW takes advantage of latest materials technologies and manufacturing techniques, range from 125 W (0.17 HP) to units greater than 2500 kW (3350 HP).



Portable and Fixed Mount

The Enhanced Classic Line (ECL) are fixed mount and portable mixers that offer the highest performance and quality, giving an even stronger and more versatile product.



Series 10

Durable, versatile, cost-effective, the field proven series 10 unit was designed with minimal maintenance in mind. The largest taper roller bearings in a mixer of this class help produce an B10 life of 100,000 hrs or greater, the integrated "drywell" and casing design eliminate the risk of oil leakage over the tank or into the product.



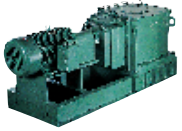
Series 70 / 80

The workhorse of the Lightnin Mixer drive range with over 40,000 placed in service since its introduction in 1970, the 70 series mechanical design technology is the industry's most proven agitator drive technology.



Series 98

A parallel shaft all helical gear design provides enhanced installation flexibility where there are space limitations on top of the vessel.



Series 780/880

From 15 kW (20 HP) to 1000 kW (1350 HP) the 780/880 series drive range is designed specifically for the most arduous large scale mixing applications. With thousands of drives operating globally on some of the most demanding duties, reliability is assured.



Series 7000

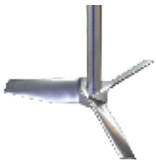
Series 7000 custom designed agitator gear drives can be found on some of the world's largest and most complex mixing applications with power requirements in excess of 1000 kW (1350 HP).

VSF

Purpose-built agitators for harsh FGD environments. The rugged gearbox is designed with a high service factor for long life, while removable couplings make maintenance easier. An FGD Slurry seal is designed to further lengthen the availability of the unit in operation.

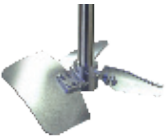
CORE TECHNOLOGY IMPELLERS

A310/A510



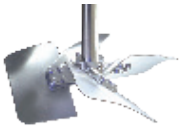
- Varying tip chord angle allows for further optimization of mixer selection
- Maximizes flow generation while minimizing fluid shear and minimizing loads on the agitator drive
- The A310 is standard for all Lightnin gear drive portable mixers
- Generates the same flow as a pitched bladed turbine (A200) for 60% of the power and 50% of the torque

A320



- 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
- Can be successfully used for gas handling applications

A315



- High blade solidity improves gas handling by up to 3 times that of a conventional hydrofoil impeller such as the A510
- Generates strong axial flow which reduces staging that occurs with radial flow impellers in tall reactors
- Can improve mass transfer by 30% compared with a Rushton impeller (R100)

- Operates at lower torque than a conventional radial flow impeller, thus reducing capital costs

R130



- Half pipe shaped blades improves gas handling over R100 impeller while reducing torque requirements by up to 40%
- Radial design provides shear to achieve good contacting for liquid-liquid and gas-liquid dispersions and emulsions

R135



- Optimized parabolic blade shape improves gas handling ability by 20% and reduces torque requirements by 40% over an R130
- Radial design provides shear to achieve good contacting for liquid-liquid and gas-liquid dispersions and emulsions

CHEMICALS & PETROCHEMICALS



World class chemical and petrochemical companies around the globe rely on the mixing expertise and experience behind the Lightnin brand to maximize process efficiency and minimize operating costs. Reliability and low cost of ownership are assured from standard equipment of 125 W (0.17 HP) through to custom designed equipment for critical process operations in excess of 2500 kW (3350 HP).

Extensive experience from Acetic Acid to VCM

- Blending, high and low viscosity, Newtonian & non-Newtonian
- Crystallization
- Dispersion, Dissolution
- Heat Transfer
- Polymerization: bulk, condensation, emulsion, solution, suspension
- Reaction and Mass Transfer: Liquid-Liquid, Liquid-Solid, Gas-Liquid, Gasliquid-Solid
- Solids Suspension

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