

# LANCASTER PRODUCTS

World Leaders in Material Processing Equipment



Lancaster® High Shear Mixers

**LANCASTER®  
PRODUCTS**



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**LANCASTER®  
PRODUCTS**

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The Lancaster Products Line of Material Processing Equipment

High Shear K-Series Mixers

Low Shear L-Series Mixers

K-Lab Mixers

Pug Mills

Roll Crushers

Table Feeders

Automated Material Handling and Batching Systems

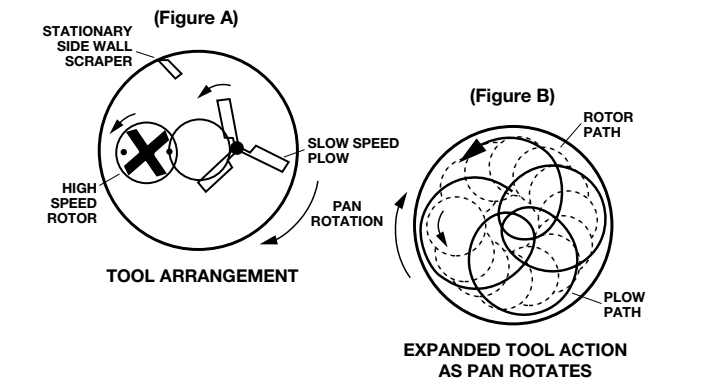
AutoBrik Molded Brick Making Machines

# Lancaster® High Shear Mixers

## MIXER ACTION

Lancaster's counter-current mixing action is widely accepted as the most effective mixing technique for consistent uniformity, thoroughness and rapid mix time. Simply stated, counter-current action occurs when the pan rotates in one direction, while the mixing tools rotate in the other. Processing times can be greatly reduced while providing a more homogenous batch using a Lancaster Mixer.

The rotating pan conveys material to the counter-rotating, primary mixing rotor, secondary mixing plows, and side wall scraper. These mixing tools are strategically placed to promote maximum material interface. This design allows for increased relative particle velocity and provides countless material exchanges throughout the batch cycle, without relying on the free fall of material.



**FIGURE A** illustrates combined action of the pan rotating clockwise while the off-center mixing tool assemblies rotate counter-clockwise.

**FIGURE B** illustrates the path of travel created by the tools as the pan completes one revolution. Multiplied in terms of RPM, this mixing action becomes very intensive.

The combination of a rotating pan, side scraper, and the counter-rotating plow eliminates all dead zones in the mixer. All feed materials are engaged by the tools. There are effectively no dead corners or unswept surfaces where ingredients can lodge. The plow and side scraper also provide for continual material removal from the pan bottom and side wall surfaces. The Lancaster Mixer has consistently shown that after identical mixing times, the discharge from a Lancaster Mixer is virtually complete compared with a stationary pan mixer.

Processing times can be greatly reduced while providing a more homogenous batch using a Lancaster Mixer. Free-flowing powders and granular materials can reach desired homogeneity within one minute. More complex applications such as mix-granulation are generally completed within a door-to-door cycle of six minutes or less. Partial batches down to 1/3 rated capacity can be handled without affecting mix quality. Lancaster production mixers can input mixing power as high as 6hp/cf = 60hp/1000 pounds of mix or as little as 10% of that for gentle mixing.

Lancaster high intensive, or high shear mixers, can handle the full gamut of materials from powders, to slips and slurries, to taffy-like materials with viscosities exceeding well over 1,000,000 CP. Specific process criteria are custom designed into each Lancaster Mixer tooling set to address the customer's specific needs. Lancaster Application Engineers design toward many directions, Pub. 500A/10

including: mixing cycle times, moisture and air entrainment, particle size distributions, surface draw-down, pumping action, and tip speed requirements.

The intensity and type of mixing action can be controlled through the use of various style mixing rotors. A very popular application of the Lancaster K-Mixer is to first homogenize a mix and then pelletize or agglomerate the material to form pellets — all in one machine. The K-Mixer can also coat pellets, de-fiber, de-lump, fluff and slurry. In certain applications the high speed rotor is removed in favor of a slower speed plow system with or without mullers.

## HORIZONTAL PAN DESIGN

Vertical axis horizontal pan mixing is the preferred design of the Lancaster Mixers. This positive and very efficient design of the pan gear drive ensures that the maximum amount of energy output is imparted into the mixing action. Pan rotation speeds can also be calculated for maximum material process effect without requiring higher speeds to move material to a higher elevation for proper mixing. The horizontal pan provides maximum production volume while minimizing contamination of the upper pan seal. The corresponding horizontal surfaces of our Lancaster Mixers provide easier and more efficient maintenance of the equipment.

The slow speed plows of the horizontal design of our Lancaster Mixers not only enhance the mixing process, but they also provide for continual cleaning of the pan bottom and assist in material discharge. The actions of our plows eliminate the duties of cleaning and discharge by a rotor and a stationary bottom scraper.

## CONSTRUCTION

The Lancaster K-Series continues the quality, sturdy construction, easy maintenance, and long life, which has been a Lancaster tradition for over 80 years.

All Lancaster Mixers are made of structurally rigid, fabricated steel construction. They are fabricated as a single unit and can be mounted on four corner pads under a heavy box beam framework.

## ROTOR

The primary mixing element of all Lancaster K series mixers is the single piece counter-rotating high speed rotor. The design of the mixing rotor will vary depending upon the particular process requirements. Rotors are available on a rebuild and exchange maintenance program. Rotors are also available with blades bolted onto the welded blade base of the rotor shaft. The single piece base rotor construction helps maintain rotor balance after blade replacement. The rotor is driven by an easily accessible V-belt drive system. The drive motor can be single speed, multiple speed, or variable speed depending upon specific processing requirements. The drive guard fully encloses the top portion of the motor and the rotor spindle.

## PLOW

Another high quality gear-motor drive is mounted on top of the mixer structure. This unit turns the slow-speed secondary mixing plows. These wear resistant plows continually sweep the entire surface of the pan bottom. This efficient slow-speed sweeping action prevents material from accumulating on the pan bottom. These plows also provide enhanced mixing action and faster mixer discharging.

## ROTATING PAN AND DRIVE

The machined pan bottom is supported by a massive precision ball bearing. The pan is turned by a large machined gear ring that

surrounds the pan wall at its base. This heavy gear ring assures a solid, concentric pan wall and a long gear life. The drive gear pinion is mounted on an easily accessible single unit gear-motor.

The pan wall and pan bottom are equipped with replaceable pan liners on all K-4 through K-10 mixers.

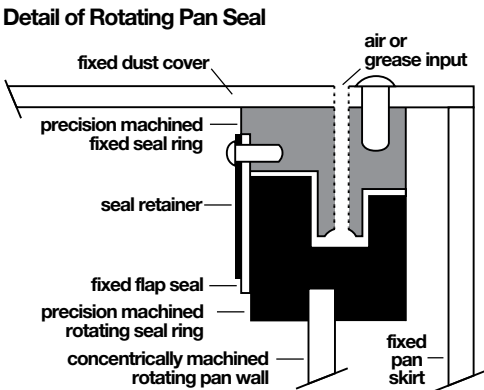
Side skirts and a top dust cover completely enclose the rotating mixing pan. The inside of the dust cover is completely flat; nothing protrudes into the pan except the mixing tools. This design allows easy cleaning of the mixing area and also keeps the shaft bearings out of the hostile pan environment.

Extensive efforts have been taken to minimize material and dust leakage from the Lancaster Mixers. To avoid material leakage, the pan wall is a single piece, machined fabrication. A wear-resistant stationary side wall scraper is mounted inside the pan. This scraper prevents build-up of material on the pan wall. The machining of the pan bottom and the pan side walls helps to ensure concentric operation of the rotating pan. This concentricity provides for more reliable side wall scraper operation.

The pan bottom is also a single piece construction with a central discharge opening. This opening is surrounded by a machined tapered sealing area that mates with the discharge valve, forming a tight self centering seal. The discharge valve assembly can be either air or hydraulically actuated.

## SEALS

The seal between the fixed dust cover and rotating pan skirt consists of two precision machined large rings. One ring forms the top of the pan. (This large, rigid ring, along with the massive gear ring at the pan bottom help maintain lifetime roundness of the mixing pan.) The other ring is attached to the bottom of the cover. A groove and rib are machined in these rings, as illustrated. This design forms a labyrinth through which any escaping dust must pass. The labyrinth groove is filled with grease or purge air. An overlap fixed flap seal also lies inside the seal ring joint. All rotating shafts that penetrate the dust cover are double sealed with grease or air purge between the seals. These features all combine to help eliminate any dust or material leakage from a Lancaster Mixer.



To provide seal and bearing lubrication, all lube lines are routed to easily accessible lube blocks. If desired, a fully automatic and self-monitoring lube system can be installed as an option.

## CONTROLS

Custom built Lancaster Controls are configured for your specific mixing application. The PLC based controls feature all required motor starters, machine and safety interlocks, process timers. These are all packaged in a single enclosure featuring user friendly operator controls. A full line of optional process instrumentation, such as material batch controls, power monitors, VFD speed controls, as well as connectivity to other plant process controls or

monitoring devices are available. Custom Lancaster Controls may be expanded to control your process up and down stream of the mixing machine. Controls could include material pre-processing, recipe management, and automated material transport systems.

## CAPACITIES

Lancaster Mixers are available in working capacities from 0.2 cu. ft. to over 210 cu. ft.

## OPTIONS

Standard options are available for heating and cooling abilities, stainless steel construction for anti-sparking or corrosion resistance, liquid, steam, or gas injection and special linings. Support framework and platforms are also available, as well as skip hoists, hoppers, table feeders, etc.

## MATERIAL HANDLING AND BATCHING SYSTEMS

Also available from Kercher Industries, Inc. are complete storage, handling, and fully automated batching systems, including a unique pneumatic delivery system. These systems are custom designed and can be as simple or sophisticated as required.

## FREE TESTING

Experimental testing of your material is available in our mixing test lab. Please inquire about our free testing.

## MIXER RENTALS

Lancaster Mixers are available for short and long term rentals, with controls, platform and mixer stand.

## LOW SHEAR MIXING

Lancaster Mixers are also available without the high speed rotor. These mixers are available in the K-Series design or the L-Series that can incorporate mulling, if necessary.

## SPECIALTY MACHINES

Please contact us if you have a process challenge that may contain a mixing or agglomerating type procedure. Lancaster Products has provided unique and profitable solutions for many customers.

## PUG MILLS

Single or twin shaft pug mill mixers are also produced by Kercher Industries, Inc.

Please inquire about our company video, free testing and rental units.

Visit our website at: [www.lancasterproducts.com](http://www.lancasterproducts.com)

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All information is subject to change without notice.  
Parts and assembly made in the U.S.A.