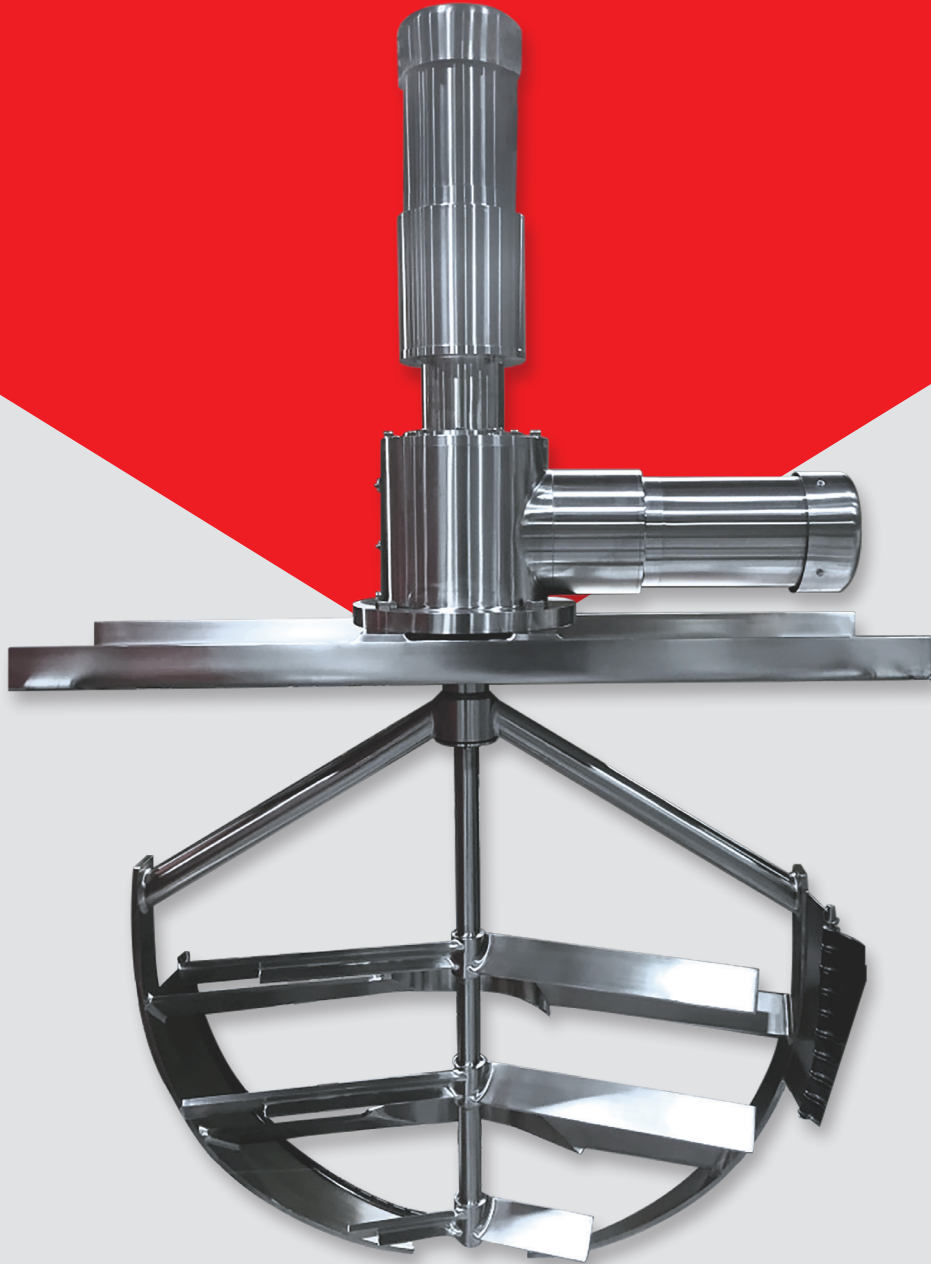


UNIQUELY LEE

The Features That Bring Processing Perfection.



ROBUST AGITATOR WITH HEAVY-DUTY DESIGN

Heavy-Duty Construction Guarantees
Long-Term Reliability

UNIQUELY LEE:

Robust Agitator with Heavy-Duty Design

Mixing is crucial to every food, pharmaceutical, chemical and cosmetic product operation, where mixing kettles and tanks must process a variety of challenging ingredients — often around the clock — to produce consistent quality and batch processing results.

The build-quality of the agitator drive is a major component of mixing kettles and tanks, and is an essential contributor to the robust, reliable and trouble-free performance needed for these demanding applications. At Lee Industries, agitator assemblies are carefully engineered and constructed to emphasize quality, performance and reliability.



Many Lee mixing kettles and tanks with original agitator drive units built over 50 years ago, are still providing daily, trouble-free service in processing operation today.

Lee Agitator Drives: Built Beyond Customer Specifications

Lee agitators can be designed and built to meet requirements for mixing and agitation of ingredients at viscosities from 1 cP (water-like materials) to 2 million cP (toothpaste or similar materials). However, **every** Lee agitator, regardless of its use at lower viscosity rates, is built for sustained mixing operations at a minimum viscosity of 100,000 cP.

This minimum 100,000 cP viscosity standard ensures exceptional performance and long-term reliability when used to mix materials with viscosities below 100,000 cP, which account for a wide range of product applications. This standard provides Lee customers with an extra margin of performance and enhances long-term reliability for daily operation. Likewise, when customers need performance at viscosities above 100,000 cP, Lee agitators can be designed for viscosities up to 2,000,000 cP.

Main Features of Lee Agitator Systems

Optimizing an agitator system means that every component in the drive chain must be engineered to deliver enhanced performance and long-term reliability. Lee agitators are built as a single, robust system with every component capable of performance and reliability in excess of requirements (also see chart on next page):

More powerful motor with higher service rating:

To power our agitator drives, we specify washdown duty, higher horsepower motors with increased service factors, to operate under heavier loads when needed. In addition to providing more than adequate power to mix a range of higher-viscosity products, a more powerful motor reduces amperage draw on the motor, which extends motor life and reduces service costs.

Robust, hollow-bore gearbox keyed in place to the motor shaft for direct drive designs:

Instead of using a weaker, direct coupling to link the motor to the agitator shaft from the gearbox, Lee uses a hollow-bore gearbox. This makes it possible to use a one-piece agitator shaft and eliminate potential coupling failure, a common failure point in conventional mixing vessels.

Heavy-duty agitator shaft and agitator assembly:

Joined to the motor and gearbox are a heavy-duty agitator shaft and agitator assembly specifically designed for viscosities of 100,000 cP to 2,000,000 cP, for more durable construction than conventional designs.

The heavy-duty Lee agitator design is one of many features of Lee kettles and tanks that enable us to offer a 2-year warranty on all Lee production vessels.

Lee Agitator Build-Quality Features

Higher Horsepower Motor

Drive units on Lee mixers use higher horsepower, washdown duty electric motors with higher service factors, to power through higher viscosity batches and eliminate motor wear due to excessive amperage draw.

Heavy-Duty Gearbox

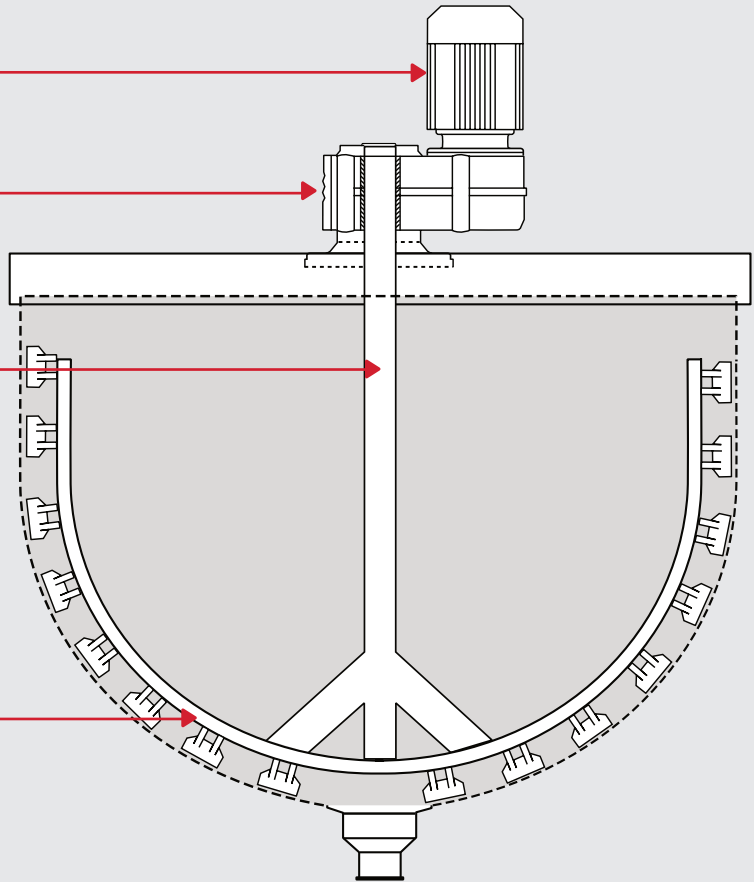
Heavy-duty, hollow-bore gear drives are keyed in place to the motor, to provide a highly secure power linkage from motor to gearbox to the one-piece agitator shaft.

One-Piece Agitator Shaft

A robust, heavy-duty one-piece agitator shaft is keyed directly to the hollow-bore output shaft of the gearbox. This eliminates the need for separate couplings or linkages usually found on two-piece assemblies, which are more likely to loosen and fail, requiring additional service (see illustration on page 7 for more detail).

Heavy-Duty Agitator Assembly

Agitator blades and cross-members are fabricated from thicker, heavy-duty stainless bar and round stock, with sanitary and polished welds.



How Higher Agitator Build-Quality Helps Your Processing Operation

This Lee design principle of "over-engineering" its agitator assemblies for use at viscosities higher than customer requirements provides several major benefits to processors and manufacturers:

Higher reliability eliminates expensive production downtime:

The higher build-quality resulting from engineering beyond the customer's rated viscosity requirement assures better long-term performance and greater continuous reliability. When the vessel is used continuously for mixing at viscosities lower than its higher viscosity rating, this over-engineering virtually eliminates unexpected, expensive production downtime due to breakdown of key drive components.

Significantly reduced ongoing service costs:

Over-engineering means using higher horsepower motors, larger gear drives and larger diameter agitator shafts and related components. Larger, higher grade components wear more slowly before needing replacement, which extends service intervals and reduces ongoing service costs for your Lee mixing kettle or tank.

Meeting new customer requirements and market opportunities:

Contract manufacturers and processors introducing new products must often be prepared to meet a variety of new mixing requirements in their process operations. A mixing vessel rated for high-viscosity operation helps you accommodate new customer or product requirements for processing products at a wider range of viscosities.

Avoiding expensive emergency repairs:

Over-engineering provides an extra margin of security and performance to your processing operations. For example, when thick ingredients are added to a batch while the agitator is operating, stress to the drive assembly is minimized or eliminated in a kettle rated for higher-viscosity use. Equipment damage risks are also minimized in cases where products, such as partially frozen food ingredients, may be unintentionally added to the kettle during full-speed mixing operation.

ROBUST AGITATOR DESIGN

The Most Common Causes of Drive-Unit Failure on Production Vessels

Because of their continuous daily use, drive-unit failures occur most often due to the following reasons:

Lack of sufficient power for mixing requirements:

Drive motors wear out more quickly when they draw amperage above their rated load, requiring more frequent service or replacement.

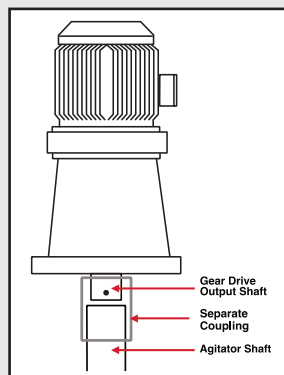
Lack of robust component design and construction:

A processing vessel's drive-train is only as strong as its weakest link, and any of these common failure points can lead to immediate work stoppages in batch operations: agitator shafts and assemblies that bend and cause premature foot bearing or gearbox bearing failure; couplings that work loose and eventually fail; and reduction gear units not built to withstand continuous hard use.

The cost to your business for every hour or day of lost production time for a kettle can be many thousands of dollars — and these costs increase exponentially if custom parts, such as agitator shafts, require several weeks to fabricate and ship.

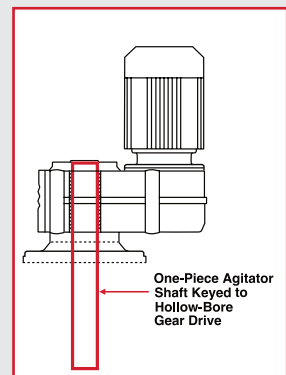
Consider these hidden costs when making specification and cost decisions on your next production vessel. Given the importance of this equipment to your business, and the losses that can occur when this equipment fails, understanding the differences between standard and heavy-duty production vessels will help you make a better, more well-informed purchase decision.

Conventional Coupled Agitator Connection:



Most conventional drive units use a separate coupler to join the agitator shaft to the gear drive or motor shaft. Over time, this coupler can eventually loosen, requiring service and production downtime.

Lee Direct Gearbox Connection:



On Lee agitator drives, both the motor and the agitator shaft are keyed directly to the hollow-bore gearbox. This high-tolerance fit assures a secure linkup of the motor and agitator to the gearbox, eliminating potential for wear at these critical locations.



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