

Tri-Mix™ Turbo-Shear™ High-Shear Mixing System



LEE INDUSTRIES
Processing Perfection.™

Blending. Dispersing. Emulsifying. The Tri-Mix™ Turbo-Shear™ does it all – and does it with authority. It's the perfect combination of the traditional Lee double-motion scraped-surface agitation system and the homogenizing prowess of the Tri-Mix™ Turbo-Shear™ mixing head. That means mass blending, powerful performance, and an impressive variety of mixing applications.

Available Optional Features of Lee's Tri-Mix™ Turbo-Shear™ Mixing System:

- Individual motors for speed and direction control of inner and outer bars
- Piggy-back motor configuration for high-viscosity applications
- Hinge support for tilting entire head/agitator assembly
- High-shear motor
- High-shear head assemblies with interchangeable configurations
- Vacuum/pressure head with manway/hand hole opening
- Fully-jacketed hemispherical bottom kettle
- Maximized arrangement of high-intensity mixing bars
- 4-blade pitched turbine
- Step-up agitator frame for probe-type sensor



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How does it work?

The Tri-Mix™ Turbo-Shear™ utilizes mechanical and hydraulic shearing to dissolve powders, blend miscible and non-miscible solutions, prepare lotions and creams, and disperse pigments. A center shaft, which can be run alone or with a double-motion agitator, operates at speeds up to 3,450 RPM. The scraped-surface, double-motion agitator is used to efficiently pull product from the vessel walls during each blending revolution. The scraped-surface agitator portion operates at speeds up to 50 RPM.

Here's how the Tri-Mix™ Turbo-Shear™ can help achieve your operational goals:

- Product viscosities up to 2,000,000 CPS on primary double-motion means you get the product right, every time.
- Available from as small as 10-quart research models to as large as 1,500-gallon production vessels.
- High ratio of hydraulic to mechanical shear means less heat, which improves product consistency and increases overall safety (when processing temperature-sensitive products).
- Sanitary design means you pass government regulations with ease and save valuable cleanup time.
- High-velocity axial and radial product flow means production will never get clogged up or slowed down.
- Continuous high or low flow mixing head means you get the power you need when you need it most.
- Unique double-motion agitator offset frame means uniform scraping action and continuous product flow.
- Custom designs mean you get custom results, especially in difficult applications.
- Batch-to-batch uniformity means your customers can count on your product.
- Product scale-up means we easily grow with your operation.
- Our Process Guarantee, based on free testing in our 25-gallon lab Tri-Mix™ Turbo-Shear™, means you have peace of mind.

Particle Size Reduction

In a particle size reduction test, we used a 25-gallon style "D12T" Lee pressure kettle with Tri-Mix™ Turbo-Shear™ agitator. The preparation by approximate weights consisted of: epoxy resin (23%), emulsified in water (29.54%) with Cellosize thickener (.20%), and surfactant (.30%). Here are the results:

We started with double-motion scraped-surface agitator at 30 RPM.

- After five minutes, particle size was 55 microns.
- After 60 minutes, particles were reduced to 30 microns.

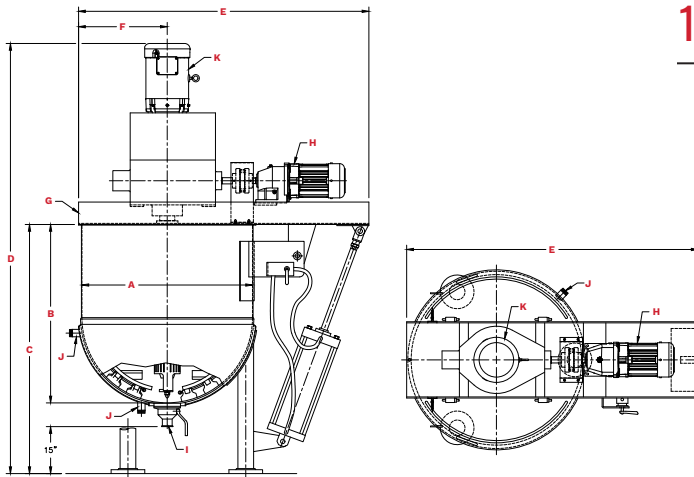
Then we used the 3,450 RPM Turbo-Shear™ with a standard head configuration.

- After an additional 40 minutes, particle size was 5 to 7 microns.

Next we added Cellosize thickener (1.04%), flint (20.48%), and pyrophyllite (25.43%). The double-motion and Turbo-Shear™ agitators were run simultaneously for one hour.

- Final particle size was 2 microns.
- Final product viscosity was 40,000 CPS.

10-Quart thru 1000-Gallon "D12T" Kettles

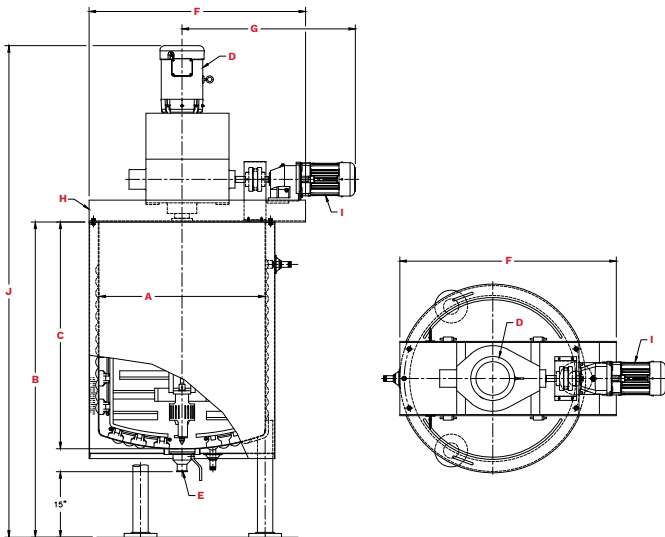


NOTES:

- G** Wide Channel
- H** HP, 230/460, 60C, 3PH, TEFC Gear Motor
- I** Lee Flush Bottom Ball Valve with Tri-Clamp Connector
- J** Steam Inlet and Condensate Outlet
- K** HP, 230/460V, 60C, 3PH, TEFC, NEMA C-Face Mount Motor (3450 RPM)

CAPACITY		25	30	40	50	60	75	80	100	125	150	200	250	300	400	500	600	750	1000	
DIMENSIONS	A	23	23	25½	29½	32	32	36	36	38	42	48	52	54	58	62	66	68	72	
	B	26	28½	30	30	30½	35	32	36½	40	40	41½	44	47	53½	57½	60½	68½	78	
	C	45⅝	48⅞	49⅝	49⅝	50⅞	54⅝	52⅞	56⅞	60⅞	60⅞	61⅞	64⅞	67⅞	73⅞	77⅞	82⅞	90⅞	100⅞	
	D	77¼	79¾	81¼	88¾	88¾	93¾	90¾	96¾	100¾	100¾	101¾	108½	111½	118	127½	132¾	140¾	153	
	E	47¾	52⅞	51⅞	53⅞	55⅞	57⅞	57⅞	57⅞	62⅞	67⅞	74⅞	77⅞	81⅞	90⅞	97⅞	103⅞	107⅞	113⅞	
	F	12⅝	12⅝	13⅞	15⅞	17⅞	17⅞	19⅞	19⅞	20⅞	22⅞	25⅞	27⅞	28⅞	30⅞	32⅞	34⅞	35⅞	37⅞	
	G	12	12	12	17	17	17	17	17	17	17	17	21	21	21	21	21	30	30	
	H	1	1	1	1	1½	1½	1½	1½	1½	1½	2	2	3	3	5	5	7½	7½	10
	I	1½	1½	1½	1½	1½	1½	2	2	2	2	2	2	2	2	2	2	3	3	3
	J	¾	¾	¾	¾	¾	1	1	1	1	1½	1½	1½	1½	1½	1½	1½	2	2	2
	K	1½	1½	1½	5	5	5	5	7½	7½	7½	7½	15	15	15	25	25	25	40	
L*	85	92	92	98	99	105	102	106	114	114	118	123	126	135	144	150	162	172		

*OVERALL MAXIMUM TILT HEIGHT.



10-Quart thru 1000-Gallon "U12S" Tanks

NOTES:

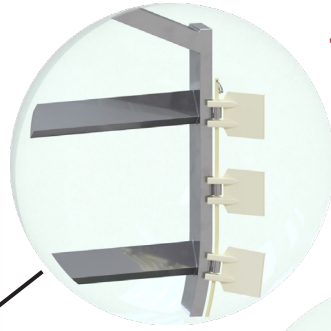
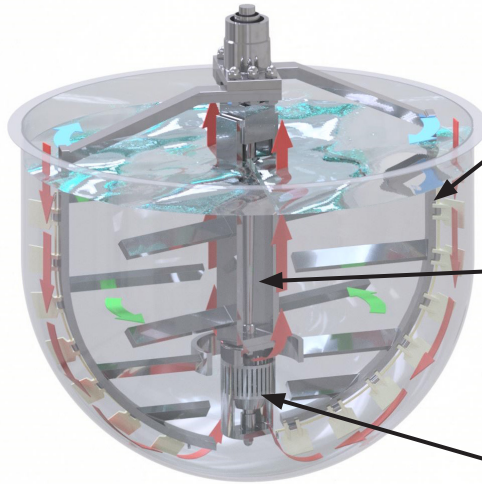
- D** HP, 230/460V, 60C, 3PH, TEFC, NEMA C-Face Mount Motor (3450 RPM)
- E** Lee Flush Bottom Ball Valve with Tri-Clamp End Connector
- H** Wide Channel
- I** HP, 230/460V, 60C, 3PH, TEFC Gear Motor

CAPACITY		25	50	75	100	125	150	200	250	300	400	500	600	700	800	1000
DIMENSIONS	A	23	26	30	34	36	38	42	46	48	48	54	59	64	68	76¼
	B	42⅝	51⅞	53⅞	55⅞	58⅞	60⅞	63⅞	66⅞	71⅞	82⅞	82⅞	84⅞	84⅞	84⅞	85⅞
	C	22½	31	33½	35	38	40	43	45½	51	62	62	62	62	62	62½
	D	1½	5	5	7½	7½	7½	7½	15	15	15	25	25	25	25	40
	E	1½	1½	1½	1½	1½	1½	2	2	2	2	2	3	3	3	3
	F	39	43	45	47	48½	51⅝	53⅞	60⅝	61⅞	64¼	67¼	73⅞	75⅝	78⅞	82¼
	G	33¼	35¾	36⅝	36⅝	36⅝	38⅞	38⅞	45⅞	45⅞	46⅞	46⅞	52¼	52¼	52¼	53
	H	12	17	17	17	17	17	17	21	21	21	21	21	21	21	21
	I	1	1	1½	1½	1½	2	2	3	3	5	5	7½	7½	7½	10
	J	74¼	89⅞	92⅞	95⅞	98⅞	100⅞	103⅞	110½	116	127	132½	134⅞	134⅞	134⅞	138

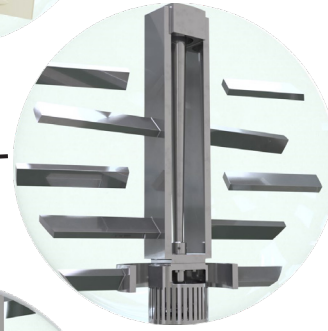
NOTE:
All dimensions are for general reference only. Consult engineering drawings for exact dimensional data.

Lee Tri-Mix™ Turbo-Shear™ High-Viscosity Mixing System

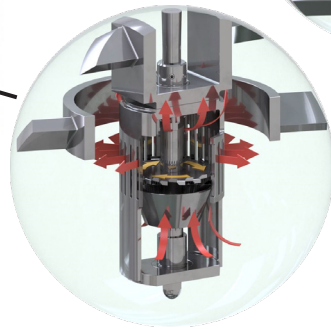
Combining Double-Motion Agitation and High-Shear Mixing for Fast, Consistent Mixing of High-Viscosity BioPharma Products up to 2,000,000 CPS.



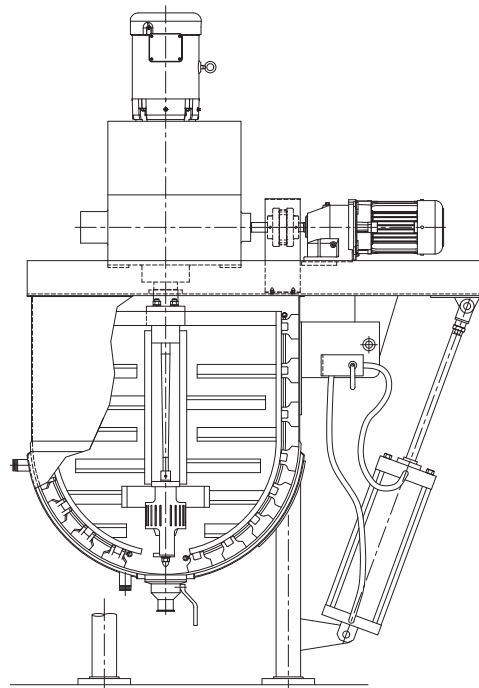
1. Robust Double-Motion Scraped-Surface Agitation pushes high-viscosity ingredients down the sides of the vessel into the high-shear mixing head.



2. Inside Counter-Rotating Mixing Bars provide additional mixing power to move ingredients forcefully around the vessel.



3. High-Shear Mixing Head expels the product at high velocity through slots in the head, creating hydraulic and/or mechanical shear to force the product to the top or bottom of the vessel, depending on head configuration.



Standard Style #12 Agitator

This drawing shows a stationary Tri-Mix™ Turbo-Shear™ processing vessel with two motors. The motor mounted on the channel powers the inner and outer double-motion, counter-rotating scraped-surface frame and bars. The motor mounted above the Lee drive assembly provides speeds up to 3,450 RPM for the high-shear head located directly over the bottom outlet of the vessel. Various options can offer flexibility for specific processing applications: triple motors for independent RPM control of mixing components, agitator tilting option for inspection and cleaning, vacuum/pressure capability with several shaft seal designs, heating/cooling jackets with Lee Uniflow coils, portability, and a choice of bar or turbine blade configurations along with various high-shear head assembly options.



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