

Mixing & Blending



Fristam
PUMPS®
Engineered For Lasting Performance®

Better Blending in Less Time

Fristam mixers and blenders improve product texture, reduce processing time, produce repeatable results, are economical to maintain and operate, and feature low maintenance designs for continuous duty and CIP.

"It used to take us 8 hours.
Now, it's only 15 minutes with
the Powder Mixer."
- Midwest cheese processor

Choose from our complete line of Blenders and Mixers

From powder induction to in-line blending and complete wet/dry blending table systems, Fristam has your mixing and blending solution.

Powder Induction

Consistent incorporation of powders into a fluid stream, with no plugging.



FZX Liquid Ring Pump
page 4

In-line Blending

Thorough blending of powders and/or liquids into a fluid stream, in one pass.



FS Shear Blender
page 6

Full Mixing System

Quick, efficient powder induction and dispersion in one ergonomic package.



Fristam
Powder Mixer
page 10

Powder Induction

Fristam's FZX produces even flow and a uniform, well-blended product, even as viscosity increases.

PULL, DON'T PUSH

The Fristam Powder Induction System utilizes the self-priming FZX series pump in combination with a restricting valve to create vacuum under a hopper to pull powder into the fluid stream. This vacuum can be maintained throughout the entire product run, ensuring your powder rate will remain consistent and fluid will not plug the funnel.

Traditional funnel-pump powder inductors rely on gravity, vortex or Venturi to push powder into fluid stream. These methods all require very specific control of the flow rate to maintain proper induction. As product viscosity changes, flow rate decreases, causing the pump to clog.

Because the FZX is designed to pump entrained air, it will not lose prime or cause fluid to back up in the funnel. The result is consistent flow, no plugging and a well-blended product.



FZX Cover





ERGONOMIC AND SAFE

The FZX can become a stand-alone powder induction system with the addition of a powder funnel or wand. Its small footprint allows operators to stand on the floor to pour the powder, eliminating dangerous ladder climbing involved with traditional large batch tanks.

CIP AND SIP

FZX series pumps are fully cleanable and steamable in place.

TYPICAL FZX POWDER INDUCTION APPLICATIONS:

Salts

- Dissolving NaCl to make brine

Sugars

- Dissolving sugar to make sucrose
- Dissolving dextrose to make glucose

FZX SERIES SPECIFICATIONS

- 6 pump heads
- 6 models (low speeds)
- Max. Flow Rate 400 gpm (90 m³/hr)
- Viscosities in excess of 5,000 cps

"Our tea powder was not being properly hydrated, which resulted in customer complaint calls. We were able to eliminate the undissolved solids and reduce our batch time by more than 50%."

– Beverage producer

In-line Blending

Fristam's FS Series Shear Blender for in-line mixing, blends products quickly and consistently. Compared to conventional methods, the Shear Blender shortens processing times significantly.

BLEND, DON'T STIR

The FS Shear Blender uses high tip speeds and close clearances to create an effective, highly turbulent mixing zone.

Traditional batch mixing processes can result in a lot of waste. Product tends to stick to the sides and bottom of the tank and may never reach the agitator. This results in extended processing time waiting for the product to blend.

With the Fristam FS, all of the product is passed through a rotor-stator system before reaching the tank, ensuring a thorough and complete mix, in minimal time.

BLENDING IN MINUTES

With the FS Blender, powders are wetted and dispersed on the first pass, dramatically reducing process times.

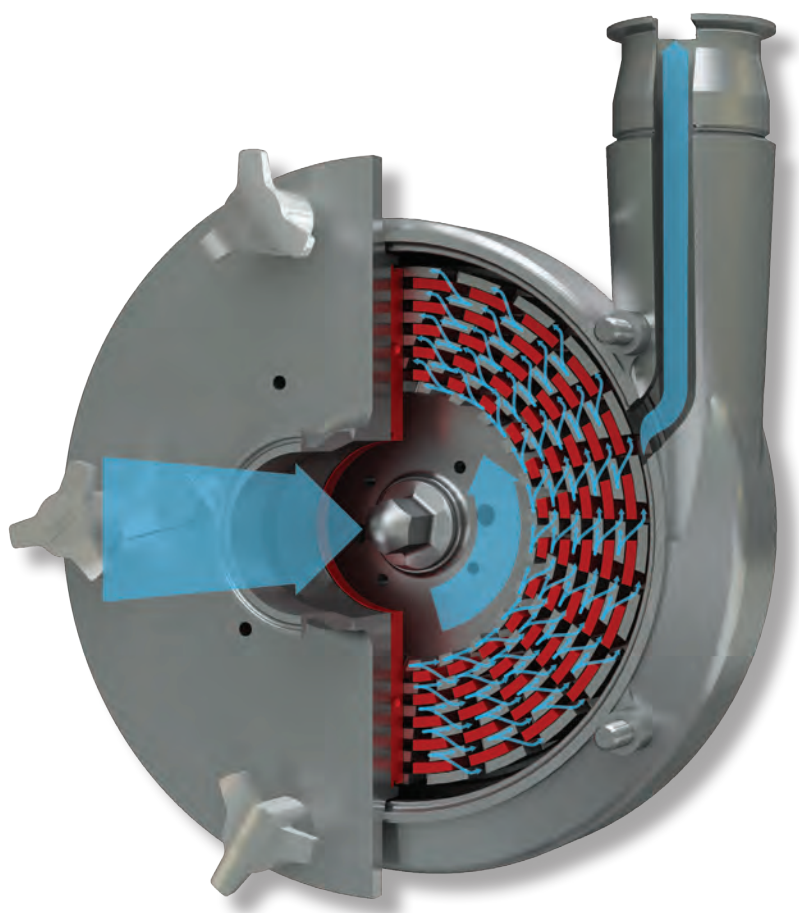
SAVES ENERGY

Since most blending can be done in a single pass, the energy is exerted precisely and for a shorter time than with in-tank mixing.

REPEATABLE RESULTS

With the FS, all of the product is processed through its rotor/stator at a controlled concentration, achieving a complete and consistent mix while saving ingredients. With a batch tank mixer, some product may be needlessly mixed over and over, while some product may not be mixed at all.





IMPROVED PRODUCT TEXTURE

Fristam's FS Shear Blender uses an intermeshed rotor/stator system to disperse particles into liquid. Its rotating teeth pass within 0.5 mm of the stationary teeth at high speeds, causing a tremendous amount of turbulence. As centrifugal force pushes the product towards the outlet, the intensity of this turbulence ensures that all product must be thoroughly blended to exit the FS.

EASY MAINTENANCE

Designed with a front-loading seal, the FS allows production personnel to service the pump in place, with no special tools.

FULLY CIP'ABLE

The fully CIP'able design of the FS meets the most stringent sanitary standards. Its internal seal performs at virtually any pressure.

DIVERSE APPLICATIONS

- Blend
- Emulsify
- Disperse
- Dissolve
- Texturize
- Reduce particle size

FS SERIES SPECIFICATIONS

- 12 Models
- Max. Tip Speed 145 ft/s (44m/s)
- Max. Flow Rate 375 gpm (85 m³/hr)
- Max. Viscosity 30,000 cps



FS Cover and Stator



- Stator Teeth
- Rotor Teeth
- Product Flow

Full Mixing System

Fristam's Powder Mixer blends dry and wet ingredients into a fluid stream and maintains performance even as product viscosity increases.

INTEGRATED SYSTEM

Fristam's Powder Mixer incorporates the uniform powder induction of the FZX liquid ring pump and thorough blending of the FS Shear Blender into a single, compact system.

CONSISTENT POWDER INDUCTION

The FZX is unparalleled as a self-priming pump, easily pulling liquids and solids together.

The table's full-port valve inducts powders fully, eliminates powder bridging and ensures maximum powder induction rate. Vacuum gauges monitor suction for repeatable results.

BLENDS BETTER

Using an intermeshed rotor/stator system, tight gaps at high speeds and high turbulence the Powder Mixer achieves a complete and consistent mix, time after time.

PROCESSES LARGER BATCHES

Since the Fristam Powder Mixer is an in-line system, the batch size is infinite.

BLENDS IN MINUTES

Powders can be wetted and dispersed on the first pass through the Powder Mixer, dramatically reducing process times.





PORTABLE

Smaller models are portable, with locking wheels. The Powder Mixer can be moved easily to different processes as needed.

ERGONOMIC & SAFE

The Powder Mixer operates at floor-level, eliminating dangerous ladder climbing or accidental falling or dropping of equipment from mezzanines. Also, with its waist-height funnel top, there is no bending to pour.

WHY IT'S BETTER THAN BATCH MIXERS

- Devours lumps and clumps
- Blends in minutes
- Processes larger batches

WHY IT'S BETTER THAN FUNNEL/PUMP COMBINATIONS

- High-intensity blending
- Repeatable product consistency

NO RISK TRIAL

Fristam offers on-site trials with your product. For only a nominal fee, Fristam will put our powder mixer to work for you, so you can see the amazing results for yourself.

- Fully operational powder mixer
- Factory-trained technician on-site
- Expert process guidance

"It proved so successful, we kept it. The chemist and I wouldn't let it leave. We were able to achieve results that we weren't able to achieve with the old system, and in only 30 minutes mixing time."

– E. Martinez, Coats Aloe International

Powder Mixer Applications

DAIRY

- Flavored milk
- Eggnog
- Ice cream mix
- Light & low fat sour cream

BEVERAGE

- Soda syrups & concentrate
- Sucrose solution
- Green tea
- Hops Induction

FOOD

- Hummus
- Salsa & hot sauce
- Fruit puree

COSMETIC

- Shampoo & conditioner
- Sanitizer gel

BIO-PHARMACEUTICAL

- Media prep
- Buffer solution
- Glucose

INDUSTRIAL

- Paintballs



Powder Mixer	Liquid Flow Rate	Max. Induction Rate lbs/min (kg/min)			
Model	GPM (m ³ /hr)	Sugar/Salt	Starch/WPC/Cocoa	Pectin	Carbopol/Xanthan
01-10	7-15 (1.6-3.4)	30 (13.6)	20 (9.1)	6 (2.7)	3 (1.4)
10-52	34-50 (7.7-11.4)	100 (45)	67 (30)	20 (9)	10 (4.5)
15-53	34-90 (7.7-20.4)	175 (79)	117 (53)	35 (16)	18 (8)
20-53	55-120 (12.5-27.3)	225 (102)	151 (69)	45 (20)	23 (10)
25-54	55-150 (12.5-34.1)	300 (136)	201 (91)	60 (27)	30 (13.6)
FZX-only Powder Mixers are available for highly soluble solids, such as sugar and salt.					

Powder Mixer Options

The Fristam Powder Mixer can be configured to meet a wide array of processing needs specific to each industry.



BEVERAGE PACKAGE

- Double seals
- Drum unload port

DAIRY PACKAGE

- Rectangular funnel
- Funnel screen
- Funnel lid

PHARMA PACKAGE:

- Validation package
- Product testing & certifications
- Casing drains
- Diaphragm valves
- 15 Ra finish with electropolish on product contact areas

PERSONAL CARE PACKAGE:

- Variable frequency drive
- Funnel orifice

HOPS DOSING PACKAGE:

- Funnel gas blanket

In-line Blending Options

FSI OPTION

Fristam's FSI Series Shear Pump is an impeller-style version of the Fristam FS Series Shear Blender. A pump and blender in one—for applications requiring both pumping and mixing—Fristam's FSI has an integrated impeller that provides high flow rates while still mixing your product.

TYPICAL APPLICATIONS

- Biodiesel
- Ice cream mix
- Supplemental mixing after a batch tank

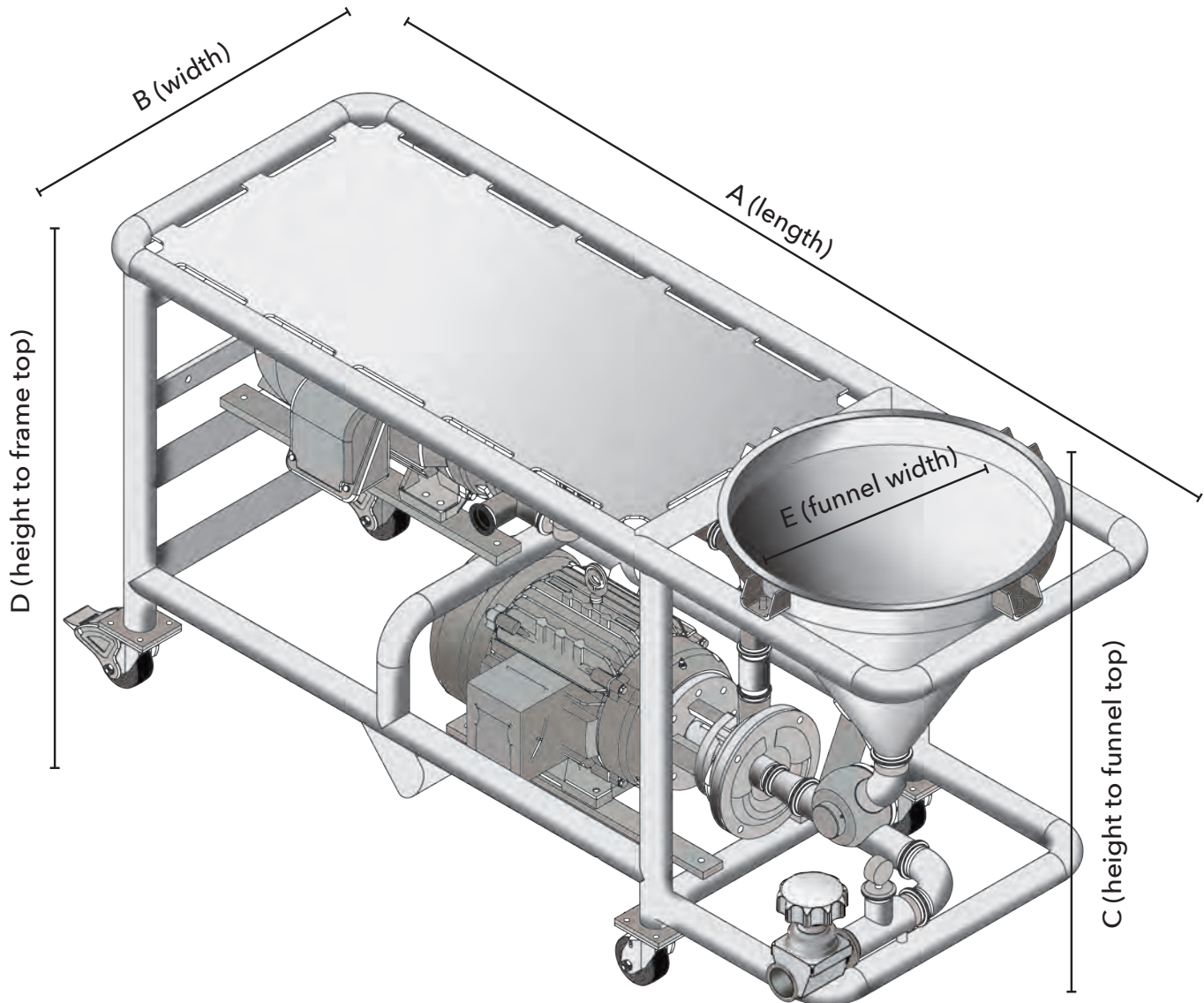
FSI SERIES SPECIFICATIONS

- 10 Models
- Max. Tip Speed 145 ft/s (44m/s)
- Max. Flow Rate 375 gpm (85 m³/hr)
- Max. Viscosity 30,000 cps



Powder Mixer Dimensional Drawing

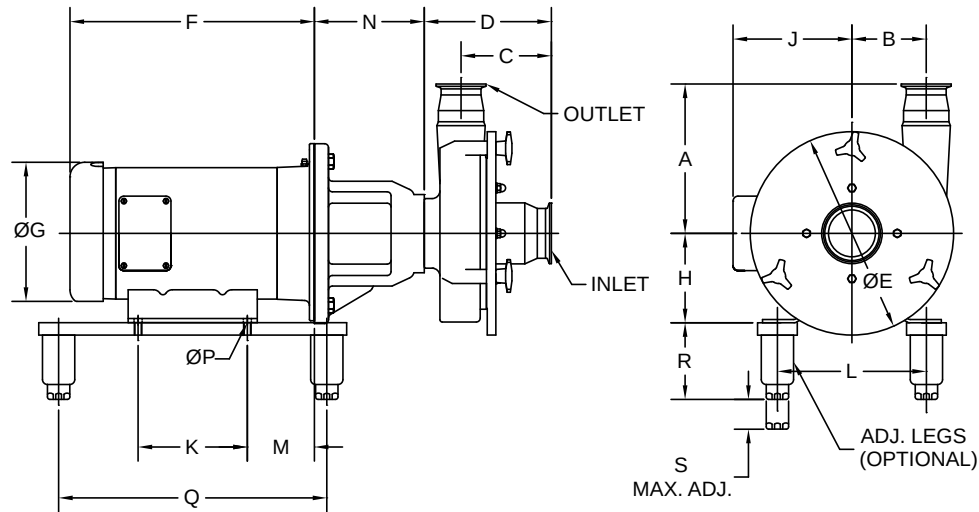
There are several standard model sizes, depending on the powder being mixed and the flow rate.



Model	FZX Model	FS Model	Inlet	Outlet	A	B	C	D	E
01-10	2010	712	1.5 (3.8)	1.5 (3.8)	56 (142)	30 (76.2)	36.5 (92.7)	34 (86.4)	12 (30.5)
10-52	2100	3522	2 (5.1)	2 (5.1)	71 (180)	30.5 (77.5)	40.5 (103)	38 (96.5)	24 (61)
15-53	2150	3532	2 (5.1)	2 (5.1)	71 (180)	30.5 (77.5)	41.5 (105)	38 (96.5)	24 (61)
20-53	2200	3532	2.5 (6.4)	2.5 (6.4)	83 (211)	30.5 (77.5)	41.5 (105)	39 (99.1)	24 (61)
25-54	2250	3542	2.5 (6.4)	2.5 (6.4)	83 (211)	30.5 (77.5)	41.5 (105)	39 (99.1)	24 (61)

All dimensions are in inches (centimeters).

FS Shear Blender Dimensional Drawing



NOTE:

1. MOTOR DIMENSIONS MAY VARY DEPENDING ON MANUFACTURER REQUESTED.
2. BLENDER DIMENSIONS ARE BASED ON CLAMP FITTINGS.
3. ALL DIMENSIONS ARE IN MILLIMETERS (INCHES).

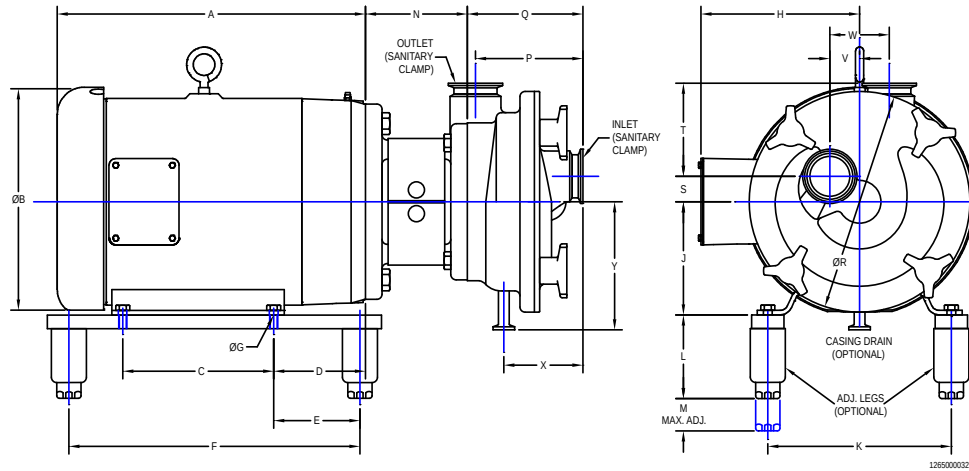
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REV. B

PUMP MODEL	INLET	OUTLET	A	B	C	D	E
711 / 712	2"	1.5"	144 5.67"	58 2.28"	113 4.45"	145 5.71"	185 7.28"
721 / 722	2"	1.5"	170 6.69"	79 3.11"	113 4.45"	145 5.71"	230 9.06"
3521 / 3522	2.5"	2"	190 7.48"	80 3.15"	118 4.65"	157.5 6.2"	230 9.06"
3531 / 3532	2.5"	2"	191 7.52"	95 3.74"	115.5 4.55"	157.5 6.2"	260 10.24"
3541 / 3542	3"	2.5"	211 8.31"	115 4.53"	118 4.65"	157.5 6.2"	290 11.42"
3551 / 3552	3"	2.5"	230 9.06"	140 5.51"	119 4.69"	170 6.69"	350 13.78"

MOTOR HP		MOTOR FRAME	F	G	H	J	K	L	M	N	P	Q	R	S
1750 RPM	3500 RPM													
1 HP	1.5 HP	143TC	284 11.18"	175 6.89"	89 3.5"	133 5.25"	101.6 4"	140 5.5"	127 5"	120 4.72"	8.7 0.34"	356 14"	98 3.86"	38 1.5"
1.5 HP		145TC	284 11.18"	175 6.89"	89 3.5"	133 5.25"	127 5"	140 5.5"	127 5"	120 4.72"	8.7 0.34"	356 14"	98 3.86"	38 1.5"
2 HP	2 HP	145TC	284 11.18"	175 6.89"	89 3.5"	133 5.25"	127 5"	140 5.5"	127 5"	120 4.72"	8.7 0.34"	356 14"	98 3.86"	38 1.5"
	3 HP	182TC	340 13.39"	221 8.7"	114 4.5"	149 5.87"	114 4.5"	191 7.5"	108 4.25"	169 6.65"	10.3 0.41"	356 14"	98 3.86"	38 1.5"
3 HP		182TC	354 13.94"	221 8.7"	114 4.5"	149 5.87"	114 4.5"	191 7.5"	108 4.25"	169 6.65"	10.3 0.41"	356 14"	98 3.86"	38 1.5"
	5 HP	184TC	354 13.94"	221 8.7"	114 4.5"	149 5.87"	140 5.5"	191 7.5"	108 4.25"	169 6.65"	10.3 0.41"	356 14"	98 3.86"	38 1.5"
5 HP		184TC	354 13.94"	221 8.7"	114 4.5"	149 5.87"	140 5.5"	191 7.5"	108 4.25"	169 6.65"	10.3 0.41"	356 14"	98 3.86"	38 1.5"
	7.5 HP	184TC	423 16.65"	221 8.7"	114 4.5"	149 5.87"	140 5.5"	191 7.5"	108 4.25"	169 6.65"	10.3 0.41"	356 14"	98 3.86"	38 1.5"
7.5 HP		213TC	403 15.87"	260 10.25"	133 5.25"	187 7.38"	140 5.5"	216 8.5"	108 4.25"	169 6.65"	10.3 0.41"	356 14"	98 3.86"	38 1.5"
	10 HP	215TC	403 15.87"	260 10.25"	133 5.25"	187 7.38"	178 7"	216 8.5"	108 4.25"	169 6.65"	10.3 0.41"	356 14"	98 3.86"	38 1.5"
10 HP		215TC	416 16.38"	260 10.25"	133 5.25"	187 7.38"	178 7"	216 8.5"	108 4.25"	169 6.65"	10.3 0.41"	356 14"	98 3.86"	38 1.5"
	15 HP	215TC	515 20.28"	260 10.25"	133 5.25"	187 7.38"	178 7"	216 8.5"	108 4.25"	169 6.65"	10.3 0.41"	356 14"	98 3.86"	38 1.5"
15 HP		254TC	499 19.65"	327 12.87"	159 6.25"	244 9.63"	210 8.25"	254 10"	102 4"	169 6.65"	13.5 0.53"	406 16"	98 3.86"	38 1.5"
	20 HP	256TC	499 19.65"	327 12.87"	159 6.25"	244 9.63"	254 10"	254 10"	102 4"	169 6.65"	13.5 0.53"	406 16"	98 3.86"	38 1.5"
20 HP		256TC	499 19.65"	327 12.87"	159 6.25"	244 9.63"	254 10"	254 10"	102 4"	169 6.65"	13.5 0.53"	406 16"	98 3.86"	38 1.5"
	25 HP	284TSC	588 23.15"	371 14.63"	178 7"	333 13.13"	241 9.5"	279 11"	121 4.75"	179 7.05"	13.5 0.53"	445 17.5"	118 4.63"	45 1.75"
25 HP		284TC	588 23.15"	371 14.63"	178 7"	333 13.13"	241 9.5"	279 11"	121 4.75"	179 7.05"	13.5 0.53"	445 17.5"	118 4.63"	45 1.75"
	30 HP	286TSC	588 23.15"	371 14.63"	178 7"	333 13.13"	279 11"	279 11"	121 4.75"	179 7.05"	13.5 0.53"	445 17.5"	118 4.63"	45 1.75"
30 HP		286TC	588 23.15"	371 14.63"	178 7"	333 13.13"	279 11"	279 11"	121 4.75"	179 7.05"	13.5 0.53"	445 17.5"	118 4.63"	45 1.75"
	40 HP	324TSC	636 25.04"	419 16.5"	203 8"	359 14.13"	267 10.5"	318 12.5"	121 4.75"	179 7.05"	16.7 0.66"	470 18.5"	118 4.63"	45 1.75"
40 HP		324TC	636 25.04"	419 16.5"	203 8"	359 14.13"	267 10.5"	318 12.5"	121 4.75"	179 7.05"	16.7 0.66"	470 18.5"	118 4.63"	45 1.75"
	50 HP	326TSC	636 25.04"	419 16.5"	203 8"	359 14.13"	305 12"	318 12.5"	121 4.75"	179 7.05"	16.7 0.66"	470 18.5"	118 4.63"	45 1.75"
50 HP		326TC	636 25.04"	419 16.5"	203 8"	359 14.13"	305 12"	318 12.5"	121 4.75"	179 7.05"	16.7 0.66"	470 18.5"	118 4.63"	45 1.75"
	60 HP	364 TSC	685 26.97"	470 18.5"	229 9.02"	383 15.08"	286 11.26"	356 14.02"	89 3.5"	209 8.23"	16.7 0.66"	508 20"	127 5"	45 1.75"
60 HP		364 TC	685 26.97"	470 18.5"	229 9.02"	383 15.08"	286 11.26"	356 14.02"	89 3.5"	209 8.23"	16.7 0.66"	508 20"	127 5"	45 1.75"
	75 HP	365 TSC	685 26.97"	470 18.5"	229 9.02"	383 15.08"	311 12.24"	356 14.02"	89 3.5"	209 8.23"	16.7 0.66"	508 20"	127 5"	45 1.75"
75 HP		365 TC	685 26.97"	470 18.5"	229 9.02"	383 15.08"	311 12.24"	356 14.02"	89 3.5"	209 8.23"	16.7 0.66"	508 20"	127 5"	45 1.75"

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Rev.B

FZX Series Pump Dimensional Drawing



MOTOR HP	MOTOR	DIMENSIONS IN MILLIMETERS (INCHES)												
1750 RPM	FRAME	A	ØB	C	D	E	F	ØG	H	J	K	L	M	N
2 HP	143TC	354 (13.92")	Ø178 (Ø7.01")	101.6 (4.00")	73 (2.87")	102 (4.00")	343 (13.50")	Ø10.5 (Ø.41")	145 (5.71")	88.1 (3.47")	139.7 (5.50")	98.5 (3.88")	38 (1.50")	120 (4.72")
3 HP	182TC	354 (13.92")	Ø183 (Ø7.19")	114 (4.50")	73 (2.87")	102 (4.00")	343 (13.50")	Ø10.5 (Ø.41")	149 (5.87")	114 (4.50")	191 (7.50")	98.5 (3.88")	38 (1.50")	120 (4.72")
5 HP	184TC	361 (14.20")	Ø226 (Ø8.92")	140 (5.50")	73 (2.87")	102 (4.00")	343 (13.50")	Ø10.5 (Ø.41")	149 (5.87")	114 (4.50")	191 (7.50")	98.5 (3.88")	38 (1.50")	120 (4.72")
7.5 HP	213TC	383 (15.10")	Ø263 (Ø10.34")	140 (5.50")	89 (3.50")	102 (4.00")	343 (13.50")	Ø10.5 (Ø.41")	187 (7.37")	133 (5.25")	216 (8.50")	98.5 (3.88")	38 (1.50")	120 (4.72")
10 HP	215TC	398 (15.65")	Ø263 (Ø10.34")	178 (7.00")	89 (3.50")	102 (4.00")	343 (13.50")	Ø10.5 (Ø.41")	187 (7.37")	133 (5.25")	216 (8.50")	98.5 (3.88")	38 (1.50")	120 (4.72")
15 HP	254TC	496 (19.56")	Ø270 (Ø10.62")	210 (8.25")	108 (4.25")	67 (2.63")	343 (13.50")	Ø13.5 (Ø.53")	244 (9.62")	159 (6.25")	254 (10.00")	98.5 (3.88")	38 (1.50")	120 (4.72")
20 HP	256TC	487 (19.16")	Ø336 (Ø13.25")	254 (10.00")	108 (4.25")	95 (3.75")	394 (15.50")	Ø13.5 (Ø.53")	244 (9.62")	159 (6.25")	254 (10.00")	98.5 (3.88")	38 (1.50")	120 (4.72")
40 HP	324TC	636 (25.03")	Ø413 (Ø16.25")	260 (10.25")	133 (5.25")	121 (4.75")	470 (18.50")	Ø16.7 (Ø.66")	359 (14.12")	203 (8.00")	318 (12.50")	117 (4.62")	44.5 (1.75")	171 (6.73")
50 HP	326TC	636 (25.03")	Ø413 (Ø16.25")	305 (12.00")	133 (5.25")	121 (4.75")	470 (18.50")	Ø16.7 (Ø.66")	359 (14.12")	203 (8.00")	318 (12.50")	117 (4.62")	44.5 (1.75")	171 (6.73")
60 HP	364TC	685 (26.96")	Ø467 (Ø18.38")	286 (11.25")	149 (5.87")	89 (3.50")	508 (20.00")	Ø16.7 (Ø.66")	383 (15.06")	229 (9.00")	356 (14.00")	127 (5.00")	44.5 (1.75")	171 (6.73")
75 HP	365TC	685 (26.96")	Ø467 (Ø18.38")	311 (12.25")	149 (5.87")	89 (3.50")	508 (20.00")	Ø16.7 (Ø.66")	383 (15.06")	229 (9.00")	356 (14.00")	127 (5.00")	44.5 (1.75")	171 (6.73")

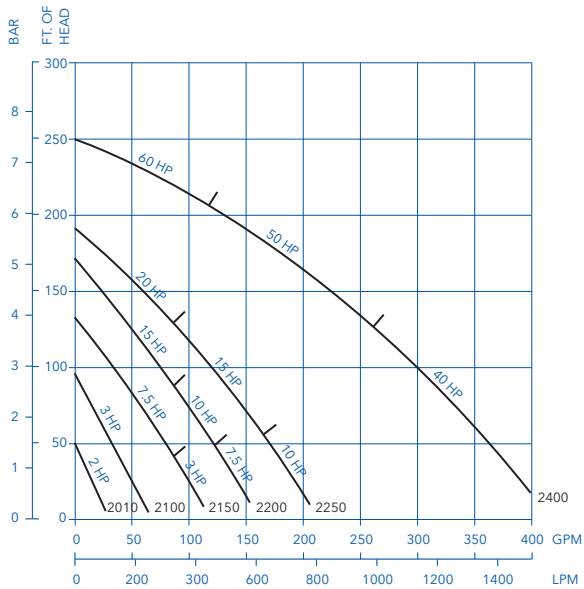
PUMP MODEL	INLET & OUTLET	DIMENSIONS IN MILLIMETERS (INCHES)								
		P	Q	ØR	S	T	V	W	X	Y
2010	1.5"	49.5 (1.95")	114.7 (4.52")	167.2 (6.58")	6.9 (.27")	105.8 (4.17")	25.6 (1.01")	69.6 (2.74")	—	—
2100/2150	2"	133.5 (5.26")	141 (5.56")	226 (8.90")	21 (.83")	110 (4.33")	30 (1.18")	62.5 (2.46")	94 (3.70")	131.5 (5.18")
2200	2"	126.9 (5.00")	136.5 (5.37")	260 (10.24")	30 (1.18")	110 (4.33")	35 (1.38")	70 (2.75")	93 (3.66")	151 (5.94")
2250	2.5"	137.5 (5.41")	141 (5.56")	275 (10.83")	25 (.98")	117 (4.61")	37.2 (1.46")	75.5 (2.97")	100 (3.94")	153 (6.02")
2400	3"	158.2 (6.23")	164.2 (6.46")	340 (13.39")	29 (1.14")	151 (5.93")	49 (1.93")	96.6 (3.80")	110 (4.33")	186.5 (7.34")

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31/16

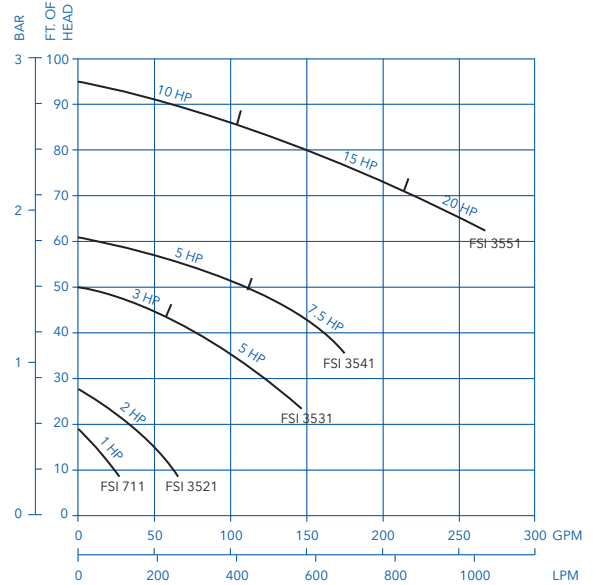
Composite Performance Curves



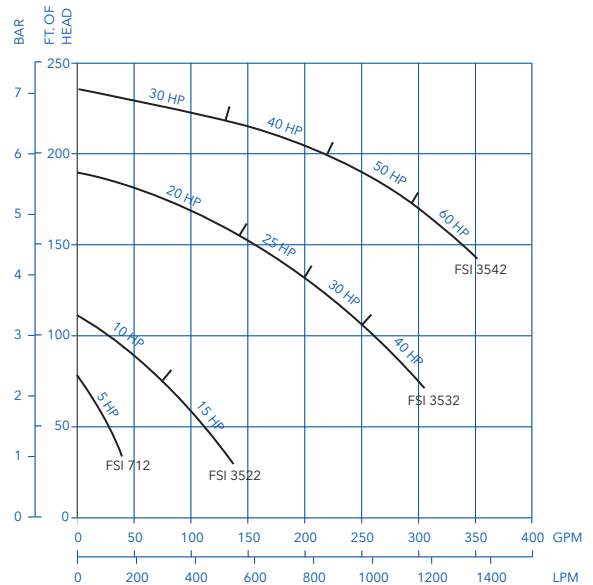
FRISTAM LIQUID RING PUMPS
FZX 1750 RPM



FRISTAM SHEAR PUMPS
FSI 1750 RPM



FSI 3500 RPM





**Designed, Manufactured &
Assembled in Middleton, WI**





CENTRIFUGAL



POSITIVE DISPLACEMENT



MIXING & BLENDING