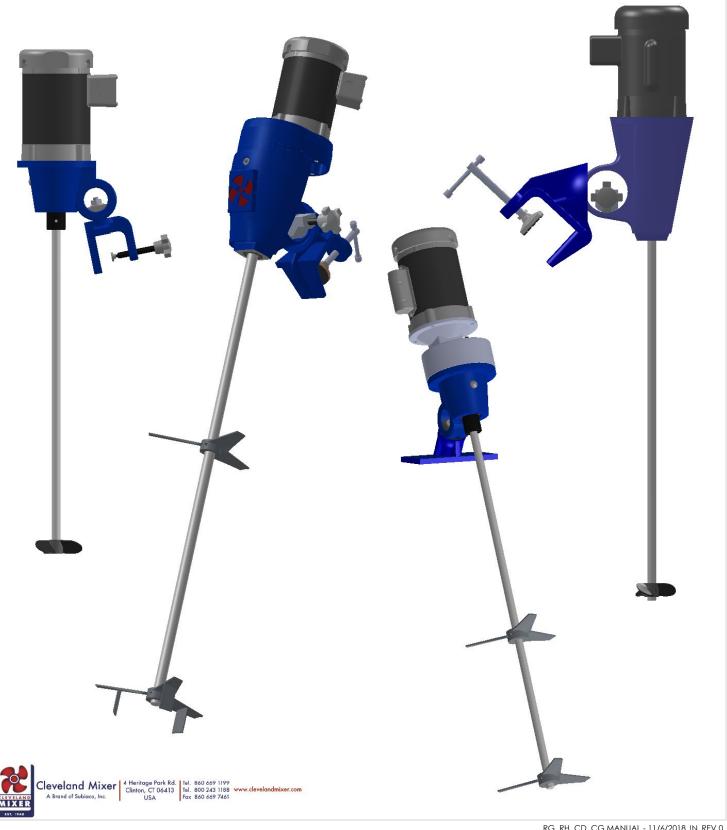
CLEVELAND MIXER

OPERATION & MAINTENANCE INSTRUCTIONS for RH & RG, PORTABLE CLAMP/SWIVEL MOUNT MIXER SERIES CD & CG, PORTABLE CLAMP/SWIVEL MOUNT MIXER SERIES

> ELECTRIC/AIR POWERED, GEAR DRIVEN MODELS: RG, RAG, CG, CAG ELECTRIC/AIR POWERED, DIRECT DRIVE MODELS: RH, RAH, CD, CA



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RECEIVING AND UNPACKING YOUR MIXER

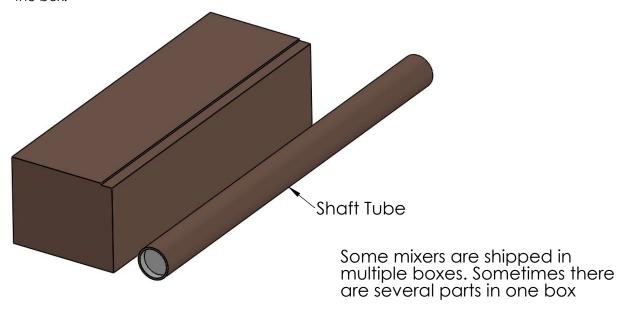
Congratulations on the purchase of your new Cleveland Mixer! If installed and operated properly, your new Cleveland Mixer will provide many years of worry-free service. Please follow the instructions provided in this manual for assembling, mounting and operating your mixer. If you have questions that are not addressed in this manual, please call Cleveland Mixer technical support toll free number: 1-800-243-1188 or find us on the web at www.clevelandmixer.com

Be sure to use care when uncrating, unpacking, lifting and handling your mixer. Certain parts such as impeller blades, hubs, couplings, steady bearings, seals, keys, hardware and other mixer accessories may be packed in boxes inside of crates or bolted down to skids. Do not discard any packing crates or materials until you've accounted for all the parts of your mixer assembly.

Make sure to check the packing slip for your shipment to make sure you've received the correct number of skids, crates and cartons. If any of the shipment was not delivered or delivered with visible damage, please contact the carrier to report the missing pieces or damage. Once you've contacted the carrier, please contact Cleveland Mixer so we can document the issue.

The drive end of the mixer might be top heavy. Never lift the drive end of the mixer by the motor. Make sure when lifting shafting to keep the ends level so not to bend the shafting. After uncrating the mixer and parts, stage them on a level surface preferably indoors or in a clean dry location. Check your unpacked mixer assembly parts against your packing slip and assembly drawing to make sure everything is accounted for before assembling your mixer.

Cleveland Mixer ships most portable mixers with the mixer drive, propellers, impellers, hardware and VFD's foamed into cardboard boxes. The shafts are typically shipped inside of a cardboard tube. Small components like hardware, needle valves and breather plugs will be sealed in plastic bags. An owners manual will be supplied with the mixer inside of the box.



FASTENERS

- Tighten all fasteners to the values shown unless specifically instructed to do otherwise.
- Lubricate all fasteners at assembly with grease, oil or anti-seize material
- If fasteners cannot be lubricated, use dry torque spec provided on chart.
- Loose hardware can cause catastrophic damage. It is very important to check all fasteners at scheduled maintenance intervals.
- If your process is corrosive or sanitary check the wetted hardware to make sure it is the correct grade before assembly.
- Always use washers and lock washers if they were provided.

USA Standard	GRADE 5		rd GRADE 5 GRADE 8		316 STAINLESS STEEL	
THREAD SIZE	FT LB DRY	FT LB LUBED	FT LB DRY	FT LB LUBED	FT LB DRY	FT LB LUBED
1/4-20	8	6.3	12	9	6	5
5/16-18	17	13	24	18	11	10
3/8-16	30	23	45	35	20	17
7/16-14	50	35	70	50	33	28
1/2-13	75	55	110	80	45	38
9/16-12	110	80	150	110	59	50
5/8-11	150	110	210	160	96	82
3/4-10	260	200	380	280	131	111
7/8-9	430	320	600	450	202	172
1-8	640	480	910	680	299	254

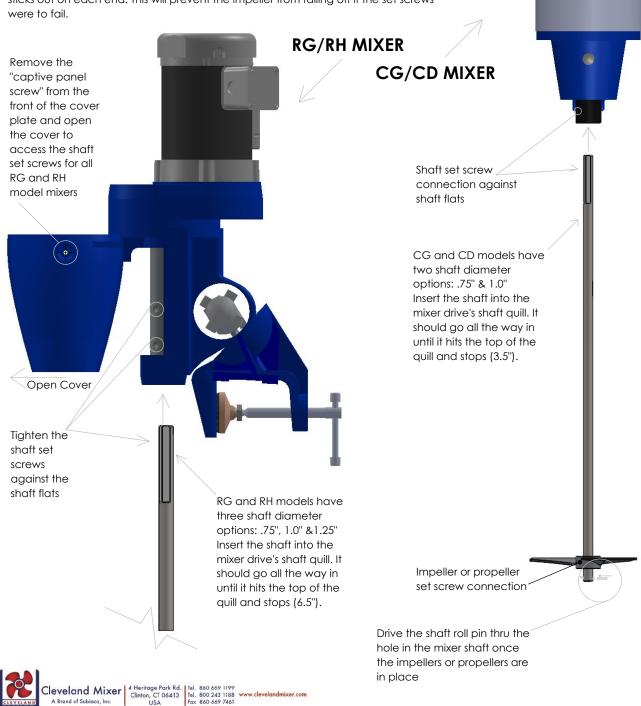
Calculated tightening torques are based on conventional 60°F, clean and dry or lubricated (as indicated above) thread. Standard fasteners will be supplied with a split lock washer. Cleveland Mixer recommends a minimum of grade 5 (ASTM A449) for all hardware to 1-8 and grade SAE 8 for larger sizes.

SHAFT CONNECTIONS

Cleveland Mixer portable clamp mounted or cup plate mounted mixer shafts and impellers (or propellers) fasten together with set screws (standard). RG and RH model shafts have angled flats at the top of the shaft and four 3/8-24x1/2", zinc, cup point set screws should seat against the shaft flats (two per) to drive the shaft without spinning and damaging the shaft. RG and RH models have a cover plate that needs to be opened to access the shaft connection set screws.

CG and CD model shafts have angled flats at the top of the shaft and two 1/4-28x3/8", zinc, cup point set screws should seat against the shaft flats (two per) to drive the shaft without spinning and damaging the shaft.

Impellers and propellers typically have two stainless steel, cup point set screws (size varies by impeller diameter) that will fasten directly to the mixer shaft. Cleveland Mixer recommends using thread locking compound and a torque wrench (torque specs available on page 2) to secure these set screws. A oversized roll pin will be provided with your shaft, once the impellers are in place, drive this roll pin thru the shaft so that it sticks out on each end. This will prevent the impeller from falling off if the set screws were to fail.



AIR AND ELECTRIC POWERED MOTORS

Horse Power

.25

.33

.50

.75

1

1.5

2

Cleveland Mixer's portable clamp on mixers are supplied with an electric power or air powered motor. Direct drive mixers (RH & CD) run directly off the speed of the motor. These mixer model motor's top speed will be the max RPM. Gear driven mixer's (RG & CG) are speed reduced by their gear drive. These models top speed will be 400 RPM for the RG and 350 RPM for the CG. All Cleveland Mixer portable mixers can be customized to suit your process with options such as explosion proof, wash down duty, hazardous duty, inverter duty or stainless steel motors, variable speed drives, needle valves, filter/lubricator and power cords with an on/off toggle switch; contact Cleveland Mixer for details.

Cleveland Mixers are shipped with a set of manufacturers instructions specific to each motor. Be sure to follow those instructions with regard to connection, operation and maintenance for the motor. Electrical motors should be wired by a professional.

Air Powered

CFM

Direct 25

Gear 25

Direct 25

Gear 25

Direct 25

Gear 25

Direct 20

Gear 20

Direct 45

Gear 45

Direct 65

Gear 65

Direct 80

Gear 80

Air Pressure

Direct 45 PSI

Gear 45 PSI

Direct 45 PSI

Gear 45 PSI

Direct 45 PSI

Gear 45 PSI

Direct 80 PSI

Gear 80 PSI

Direct 90 PSI

Gear 90 PSI

Direct 90 PSI

Gear 90 PSI

Direct 90 PSI

Gear 90 PSI



The Maximum power parameters for common portable mixer models are listed below. These limits are calculated in material with viscosity and specific gravity of water (1/1). As CPS and SPG increase, the values listed below will change. Exceeding these parameters can result in overloading your mixer's motor.

Single Prop

Diameter

4"

4.5"

5"

6"

6"

6.5"

Direct Drive 1800 RPM

Double Prop

Diameter

2 x 3.5"

2 x 4"

2 x 4.5"

2 x 5"

2 x 5.5"

1 x 5 / 1 x 6"

2 x 6"

Gear Driven 350-400 RPM

Double

Impeller

2 x 9"

2 x 10"

2 x 11"

2 x 11"

2 x 12"

2 x 13"

2 x 14"

Single

Impeller

10"

11"

12"

13"

14"

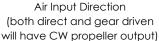
15"

16"



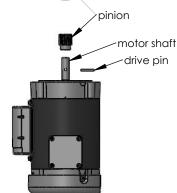
Electric Motor

Direct drive mixer models (RH & CD) mixer shaft runs directly from the motor shaft. The motor shaft should be wired to rotate clockwise when looking down from the top. All Cleveland Mixer propellers and impellers are right hand direction (unless otherwise noted) designed to rotate clockwise in forward operation. Standard pumping action both direct and gear driven mixers will push fluid downward towards the bottom of the tank, creating an axial flow pattern. Gear driven mixers should have their motors wired to run with the MOTOR SHAFT in reverse so that the <u>OUTPUT MIXER SHAFT</u> and impeller or propeller rotates clockwise when looking down from the top. Air motors for gear driven models should have the input airline inserted on right with the muffler on the left.





Direct drive mixer's are more suited for mixing smaller batches of lower viscosity materials. A good rule of thumb to follow when using a direct drive mixer is if your vessel is 750-1000 gallons or larger and/or the material you're mixing is 750-1000 CPS or greater, your application will require a gear driven mixer.



Even if you are mixing higher viscosity material in a smaller vessel, if the material is too thick it can put strain on your motor. If your motor is running hot or tripping breakers it is likely overloaded. It is a good practice to check the amperage draw on the motor during operation to make sure your motor is not running above it's nameplate load limit.

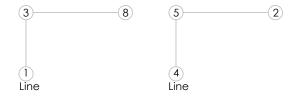
When running your mixer with a variable speed control, you should consult with Cleveland Mixer to make sure a lower shaft RPM is not putting your mixer in danger of running at or to close to first critical frequency. Running within 20% of first critical can result in excess shaft vibration that can damage your mixer.

4 Heritage Park Rd. Tel. 860 669 1199
Clinton, CT 06413
USA
Tel. 860 669 1199
Tel. 800 243 1188 www.clevelandmixer.com

WIRE DIAGRAMS FOR STANDARD AC ELECTRICAL MOTORS

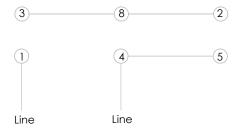
(refer to your mixer motor's manual to confirm)

Single Phase 115 Volt Input

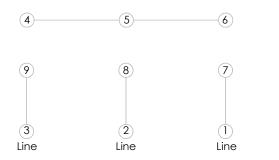


Reverse 5 & 8 to change direction

Single Phase 230 Volt Input

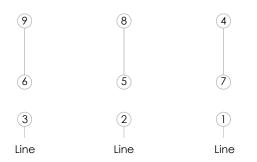


Three Phase 230 Volt Input



Interchange any two line leads to change direction

Three Phase 460 Volt Input



Interchange any two line leads to change direction

DC SPEED CONTROL

Cleveland Mixers with electric motors can be supplied with a variable speed control which allows the user to control the RPM of the mixer.

For smaller mixers with motor HP of 1/2HP or less, a 90 volt DC controller can be supplied to connect to a DC permanent magnet motor. This setup is most commonly supplied with direct drive models such as the CD-1, CD-2 & RH-1, RH-2. DC controls are not rated for use in hazardous or wet environments.

Contact Cleveland Mixer to discuss options or obtain a quote for a portable mixer with a DC controller.

AC SPEED CONTROL

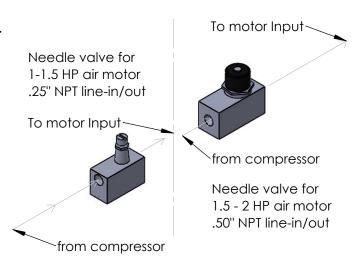
Cleveland Mixers with electric motors can be supplied with a variable speed control which allows the user to control the RPM of their mixer. For portable mixers with motor horse power of .25-3HP an AC variable speed drive can mounted directly to the motor or wall mounted and remotely wired to the motor to control the mixer's speed.

AC VFD's can be supplied with NEMA 1, NEMA 4 or NEMA 4X enclosure to suit the operating environment. The input voltage options for most AC drives as follows: 1/50 or 60/115, 1/50 or 60/230, 3/50 or 60/230, 3/50 or 60/460

With an AC VFD the mixer's motor must be 3/60/230/460 volt input. The VFD will take the input voltage and convert it to run the 3/60/230/460 motor. AC VFD's are not explosion proof rated. IN environments which require TEXP motors, the VFD should be remote mounted outside the hazardous are in a safe location.

NEEDLE VALVES & FILTER LUBRICATORS

For mixers with air powered motors you can use a needle valve to control the flow of air pressure going into the motor. By opening and shutting the valve you will be able to control the speed of the mixer shaft. For mixers with air motors operating in dusty or high humidity environments, needle valves with filters and lubricators can be used to reduce moisture going into the motor from the compressor while also keeping the motor properly lubricated. Needle valves with filter/lubricators can help extend the life span of your air motor.



REDUCER LUBRICATION

Cleveland Mixer gear driven portable clamp mount mixers are shipped factory lubricated. The RG mixer's gear case is packed with 14oz of NLGI Grade 2, high temp bearing grease (standard). An equivalent grade of food grade or EP grease can be used for sanitary applications. The grease in an RG mixer should be changed only as needed which can very based on service demands and conditions.

The CG mixer's gear drive is filled with 11oz of Klubersynth UH1-6-460. Gear driven CG mixers are also supplied with a breather plug which should be installed (prior to operation) at the highest point of the reducer, above the oil level, so that the gearbox can release pressure if it were to run hot. The oil should be changed once every three years or as needed with more intense service demands.

IMPELLERS & PROPELLERS

"Impeller" is a common term for a devise that causes fluid movement proportional to its rotation speed and blade geometry. Impellers can vary by pitch, blade width to diameter ratio, blade thickness, number of blades and single or compound pitch. Impellers are most commonly fabricated from wrought material. Impellers can have a very wide variety in their dimensionless power numbers (Np), their dimensionless flow number (Nq) and dimensionless thrust number (Nf). Impellers' diameters can range from 3.5" to 150" diameter (150" would go with another class of mixer). The number of blades can go from 2 to 6 (standard XTF-3, 3 blade supplied with most mixers).

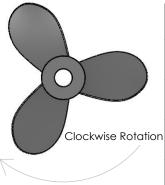
Our use of the term "Propeller" is a specific design that has a defined number of blades (3), a defined blade thickness and defined pitch. In our usage of the word "propeller", there are two geometries or pitches used. The first is a 1:1 pitch or square pitch. The second is a 1.5:1 pitch that is called steep pitch. Propellers are always cast, never fabricated owing to their blade geometry. Propellers range from 3.5" to 20" diameter in our use. The application of propellers for industrial fluid processing is generally limited to smaller mixers (up to 5HP - portable mixers with shaft diameters of .5, .625, .75, 1, 1.25 & 1.50"

(continued on next page)

IMPELLERS & PROPELLERS

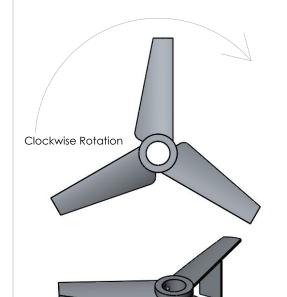
Cleveland Mixer portable clamp mount mixers come standard with either a stainless steel three blade hydrofoil impeller or a stainless steel three blade marine style square-pitch propeller. Typically direct drive mixers will be supplied with props while gear driven models are typically supplied with our XTF-3 hydrofoils. Although there are many additional diameter, style and bore size options, the most common sizes are listed below.

PROPELLERS 316SS



	Dia.	Bore	Part Number	Dia.	Bore	Part Number
	3"	.75"	313850-AAZ6	9"	1" 1.25"	313850-MMZ8 313850-MMZ10
	3.5"	.75" 1"	313850-BBZ6 313850-BBZ8	10"	1" 1.25"	313850-NNZ8 313850-NNZ10
n	4"	.75" 1"	313850-CCZ6 313850-CCZ8	11"	1" 1.25"	313850-PPZ8 313850-PPZ10
	4.5"	.75" 1"	313850-DDZ6 313850-DDZ8	12"	1" 1.25"	313850-QQZ8 313850-QQZ10
	5"	.75" 1"	313850-EEZ6 313850-EEZ8	13"	1" 1.25"	313850-RRZ8 313850-RRZ10
	6"	.75" 1"	313850-GGZ6 313850-GGZ8	14"	1" 1.25"	313850-SSZ8 313850-SSZ10
	7''	.75" 1"	313850-JJZ6 313850-JJZ8	15"	1" 1.25"	313850-TTZ8 313850-TTZ10
	8"	.75" 1"	313850-LLZ6 313850-LLZ8	16"	l" 1.25"	313850-UUZ8 313850-UUZ10

Connects to shaft with set screws (welded and polished props are also available)



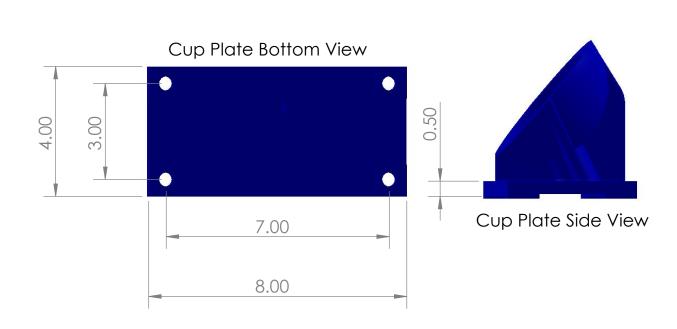
XTF-3 HYDROFOIL 316SS

,,,, ,	2	- 0 . 000		
Dia	.75" Bore	1" Bore	1.25" Bore	1.5" Bore
9	609-101-09	609-102-09	609-103-09	609-104-09
10	609-101-10	609-102-10	609-103-10	609-104-10
11	609-101-11	609-102-11	609-103-11	609-104-11
12	609-101-12	609-102-12	609-103-12	609-104-12
13	609-101-13	609-102-13	609-103-13	609-104-13
14	609-101-14	609-102-14	609-103-14	609-104-14
15	609-101-15	609-102-15	609-103-15	609-104-15
16	609-101-16	609-102-16	609-103-16	609-104-16
17	609-101-17	609-102-17	609-103-17	609-104-17
18	609-101-18	609-102-18	609-103-18	609-104-18
19	609-101-19	609-102-19	609-103-19	609-104-19
20	609-101-20	609-102-20	609-103-20	609-104-20
w/fins	609-210-	609-211-	609-212-	609-213-

Stabilizer fins are not provided with all XTF-3 hydrofoils. Stabilizer fins are typically added to impellers when needed to help balance longer shafts or add weight to the impeller if the RPM is close to first critical frequency.

Connects with set screws

RG/RH C-Clamp & Cup Plate Mount 360° Rotation 75° Rotation



3.00

3.00

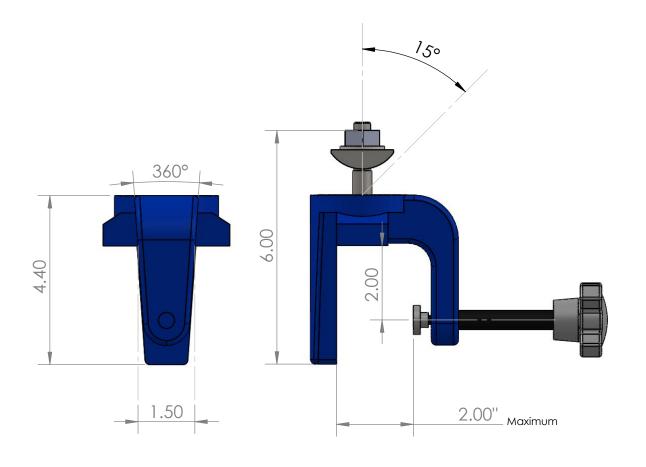
4.00

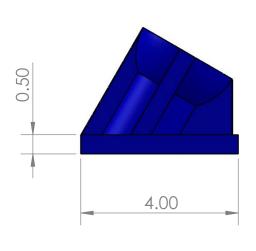
C-Clamp Top View

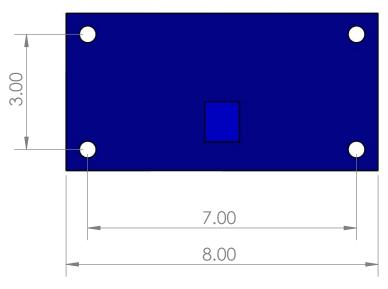
C-Clamp Side View

Maximum

CD/CG C-Clamp & Cup Plate Mount

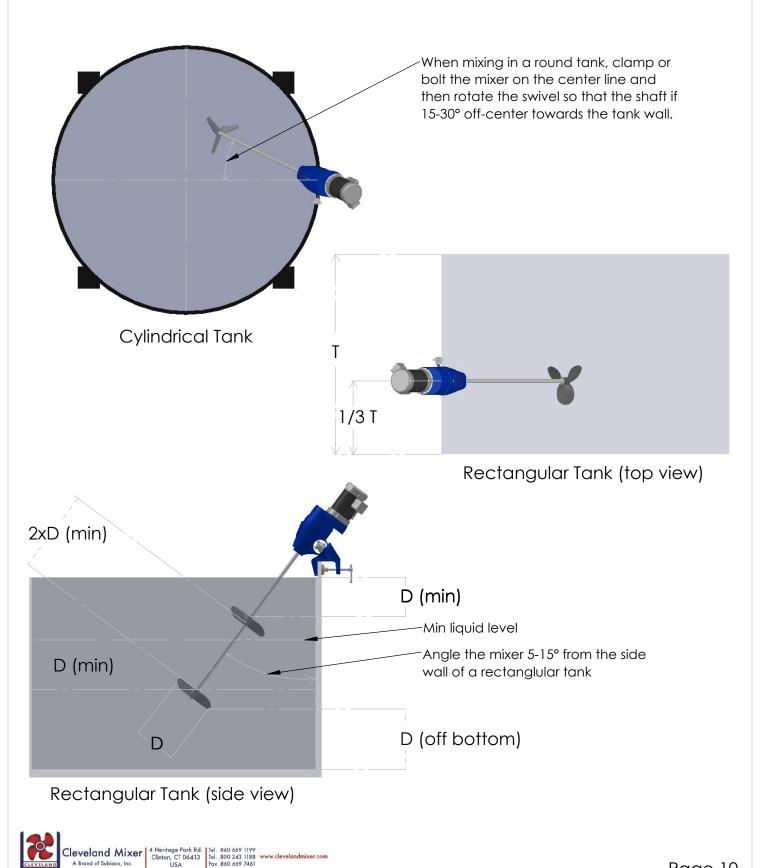






MOUNTING ORIENTATION

The figures below show the suggested mounting orientation for C-Clamp or Cup Plate mounted mixers. The orientations shown will help your mixer to acheive the best possible results while mixing the contents in your tank.



TROUBLE SHOOTING

If problems occur while your mixer is in operation, you should immediately cut off power to the mixer and use the info below to try and find the source of the problem. Continuing to run a mixer that is not operating properly can result in further damage or complete failure of your mixer. You can also contact Cleveland Mixer for assistance with trouble shooting 1-800-243-1188

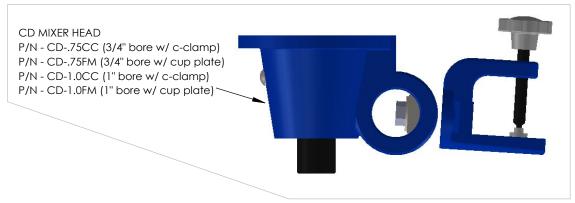
TROUBLE SHOOTING						
MIXER PART	PROBLEM	POSSIBLE CAUSES	REMEDY			
MIXER SHAKING	Clamp Issue	Worn Vibration Pad / stripped bolt thread	Replace parts			
REDUCER	Running Hot	Overloaded	Do not exceed the design capacity of the mixer. You can check the motor high load amps to see if it's overloaded. Settled solids, increased speed, increased volume/viscosity			
	Running Hot	Lubrication Issue	CG / RG mixers have gear reducers w/ lubrication inside. Both are sealed and don't require regular maint, but oil or grease still might need to be added			
	Running Hot	Ventilation Issue	The reducer's breather plug should be located above the oil fill line and should be open and clean from debris			
	Running Noisy	Broken Internal Parts	Try to isolate the source fo the sound (reducer, motor, etc.) Check mount bolts are tight and not rattling,			
	Running Hot	Running Hot High Ambient				
	Running Hot	Overloaded	Do not exceed the design capacity of the mixer. You can check your mixer's assy drawing to view load limits. Settled solids, increased speed, increased volume/viscosity can cause overload			
MOTOR	Tripusinas Dugaslasu	Overloaded	Do not exceed the design capacity of the mixer			
	Tripping Breaker	Not Wired Correctly	The motor should be wired by a qualified electrician			
	Running Noisy	Bad Bearing	Rebuild or Replace Motor			
		RPM Within 20% of First Critical	Engineered mixers are designed to run atleast 20% above/below 1st crit			
SHAFT	Vibrating/Shaking	ImpellerRunning in Reverse	Standard impellers and propellers are designed to run clockwise			
		Mounting Issue	Mixers require secure and 100% rigid mounting			
	Wobbling	Bent Shaft	Excessive runnout or a wobbling shaft can be caused by a bend in the shaft. It's possible for shafts to get bent in shipping or if left in uneven storage			
IMPELLER		Loose Set Screws	Torque the blade mounting hardware to appropriate value. Make sure to usethe			
	Vibrating/Shaking	Bent Blade	lock washers provided and thread locking compound when possible			
		On Upside Down	Follow the impeller installation instructions from page 8			
		Liquid Level	The operating liquid level should never be less than 2x the diameter of the impeller			

Note - making unauthorized modifications to your mixer can result in voiding your mixer's warranty. Please consult with the factory before making mechanical modifications.



CD EXPLODED VIEW / PARTS LIST

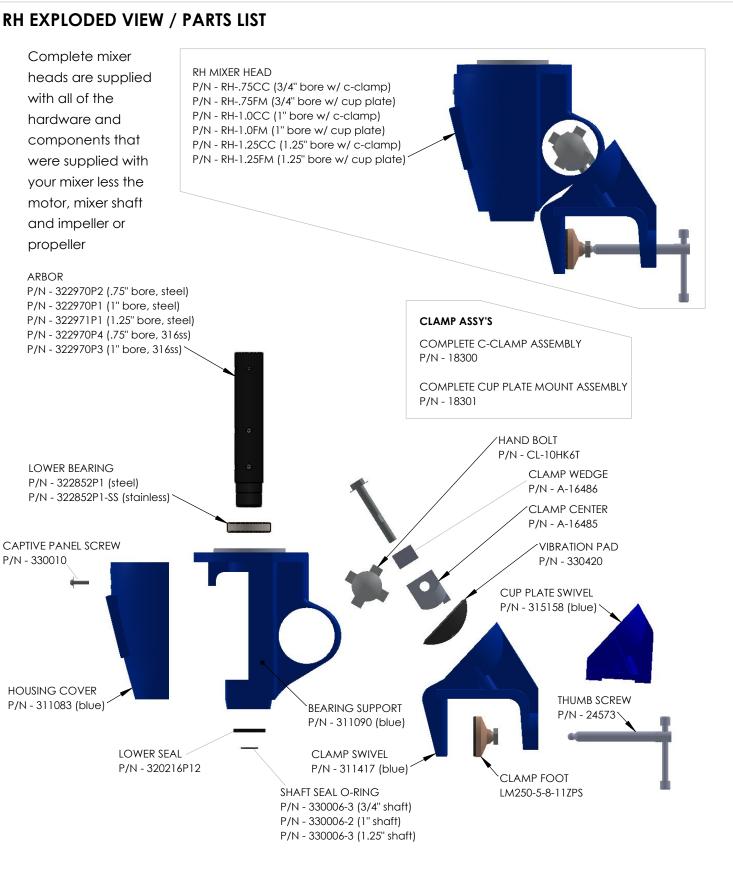
Complete mixer heads are supplied with all of the hardware and components that were supplied with your mixer less the motor, mixer shaft and impeller or propeller



COMPLETE CLAMP ASSEMBLIES ARBOR COMPLETE C-CLAMP ASSEMBLY P/N - 322970P2 (.75" bore, steel) P/N - 18300 P/N - 322970P1 (1" bore, steel) P/N - 322971P1 (1.25" bore, steel) COMPLETE CUP PLATE MOUNT ASSEMBLY P/N - 322970P4 (.75" bore, 316ss) P/N - 18301 P/N - 322970P3 (1" bore, 316ss) LOWER BEARING P/N - 322852P1 STAINLESS LOWER BEARING HANDBOLT P/N - 322852P1-S P/N - 340000 CLAMP SWIVEL PLUG BUTTON P/N - C-3928 P/N - 329388P01 **SQUARE BOLT** P/N - 340001 BEARING HOUSING P/N - 340073 SADDLE P/N - A-CPR-5 ISOLATER PAD P/N - A-CPR-31 FIXED MOUNT SWIVEL P/N - 315158-S

Some of the parts shown on this page are available in additional colors and materials of construction (such as: white epoxy coat, nickel coated, steel-it grey, uncoated aluminum & stainless steel)contact Cleveland Mixer with inquiries





Some of the parts shown on this page are available in additional colors and materials of construction (such as: white epoxy coat, nickel coated, steel-it grey, uncoated aluminum & stainless steel)contact Cleveland Mixer with inquiries

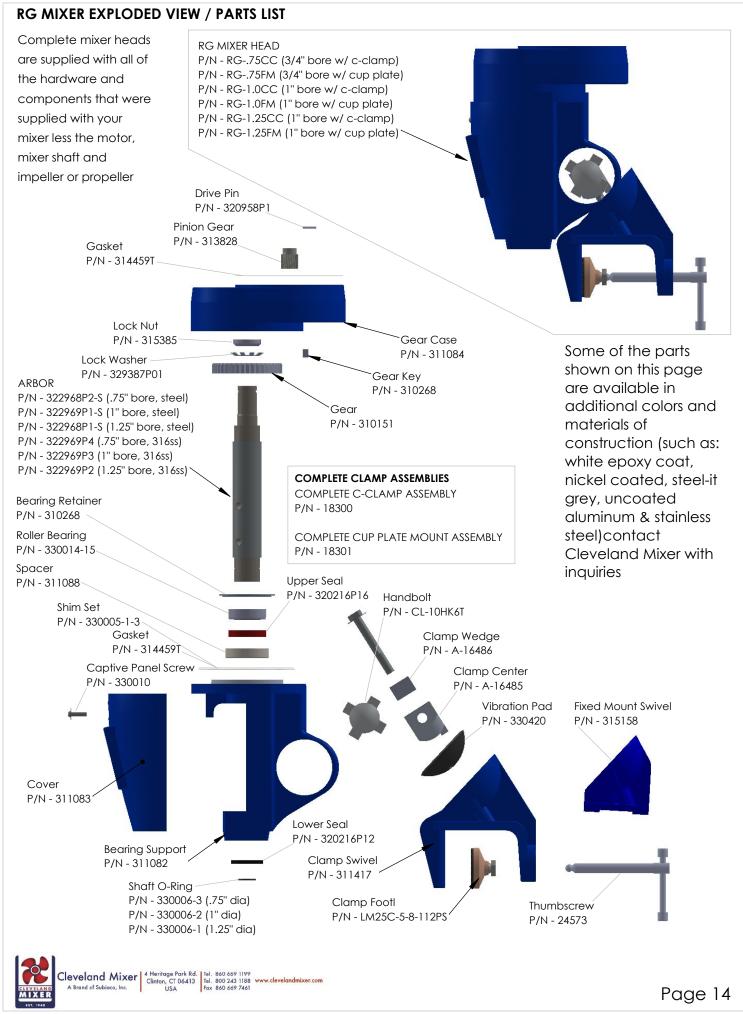


Cleveland Mixer

A Brand of Subiaco, Inc.

B Brand of Subiaco, Inc.

B



CG MIXER EXPLODED VIEW / PARTS LIST

Cleveland Mixer Clinton, CT 06413 Tel. 860 669 1199 Tel. 800 243 1188 www.clevelandmixer.com Fabruary Tel. 800 243 1188 www.clevelandmixer.com Fabruary Tel. 800 699 7461

Complete mixer heads are supplied with all of the hardware and components that were supplied with your mixer less the motor, mixer shaft and impeller or propeller

CG MIXER HEAD
P/N - CG-.75CC (3/4" bore w/ c-clamp)
P/N - CG-.75FM (3/4" bore w/ cup plate)
P/N - CG-1.0CC (1" bore w/ c-clamp)
P/N - CG-1.0FM (1" bore w/ cup plate)

Some of the parts shown on this page are available in additional colors and materials of construction (such as: white epoxy coat, nickel coated, steel-it grey, uncoated aluminum & stainless steel)contact Cleveland Mixer GEAR REDUCER with inquiries P/N - 991-333 **COMPLETE CLAMP ASSEMBLIES** ARBOR COMPLETE C-CLAMP ASSEMBLY P/N - 322970P2 (.75" bore, steel) P/N - 18300 P/N - 322970P1 (1" bore, steel) P/N - 322971P1 (1.25" bore, steel) COMPLETE CUP PLATE MOUNT ASSEMBLY P/N - 322970P4 (.75" bore, 316ss) P/N - 18301 P/N - 322970P3 (1" bore, 316ss) LOWER BEARING HANDBOLT P/N - 322852P1 P/N - 340000 STAINLESS LOWER BEARING P/N - 322852P1-S BEARING HOUSING P/N - 340073 CLAMP SWIVEL P/N - C-3928 PLUG BUTTON P/N - 329388P01 **SADDLE** SQUARE BOLT P/N - A-CPR-5 P/N - 340001 **ISOLATER PAD** P/N - A-CPR-31 FIXED MOUNT SWIVEL P/N - 315158-S

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