

**CLEVELAND**  
**MIXER**  
EST. 1940

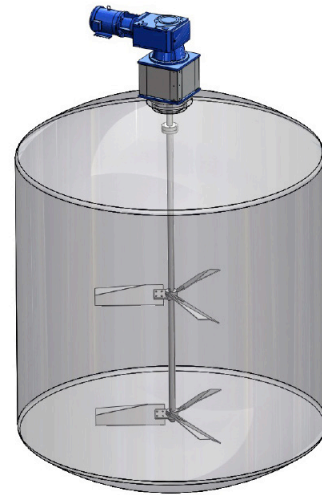
Cleveland Mixer  
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[info@clevelandmixer.com](mailto:info@clevelandmixer.com)

## RXT Top Entry Mixer (Xtraflo™ Series)

- Designed for 1,000 to 750,000+ gallon applications
- Right angle helical / bevel gear reducer provides high efficiency, outstanding impeller shaft support
- Five different impeller families, engineered to meet your most demanding process goals



### Cleveland Mixer Design Practice

The Cleveland Mixer Design Practice (CMDP) is a system that identifies, analyses and manages overall system stress, rigidity and resultant vibration. This practice insures that the mixer is optimally selected for the process conditions and integrated into the customer's mounting structure of their tank.

Agitators/mixers operating at relatively low speeds with long overhung impeller shafts place unique loads on vessels and their mounting structures. Failure to recognize and understand this reality places substantial risk on the equipment specifier and owner. Mixer and tank durability is potentially compromised when system vibration and mounting structure displacement exceed certain levels.

Cleveland Mixer has developed sophisticated FEA models in SolidWorks to assist customers with the tank and mixer specification and engineering process. The result? Improved mixer durability and reliability through less vibration; facilitated installation of the mixer and less risk for mechanical and process failure.

Our standard scope of supply is the agitator system. We can provide analysis and recommendations of the mixer mounting structure upon request.

### Motor

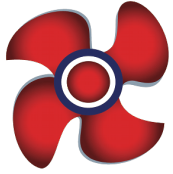
Electric motors are standard with options for air or hydraulic motors depending on application requirements.

Standard electric motor specification is NEMA motor design B, C-Face mounted, flexibly coupled, TEFC, squirrel cage induction type as required by the application. Premium efficient, severe duty and inverter duty motors are standard. Motors are selected by requirements of the application.

Motors are sized based on application parameters. It is standard engineering practice that invested horsepower does not exceed 85% of motor name plate rating.

Alignment between the motor and the gear reducer is by a flexible coupling and the c-face mounting frame. Many benefits in vibration dampening and facilitated assembly are realized.





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## Gear Reducer

RXT gear reducers are produced in an ISO 9000 certified facility. It is a drywell equipped reducer designed and applied for mixer/agitator service. This is most evident by use of a 'drop bearing' housing that features oversized bearings to support the impeller shaft and isolate the gearing from hydraulic loading.

It is a modular design with high horsepower capabilities, a broad range of available shaft diameters, c-face adapters, integrated gear motors, output ratios and lubrication options.

As a right angle bevel helical design, the RXT series is optimally suited for low head room areas. With a broad range of ratios available, the RXT series is successfully applied in tall tanks where low rpm is required to prevent critical speed problems or the use of steady bearings.

Foot or flange mounting is available. Solid Output Shaft or Hollow Bore Low Speed Couplings. Torque rated beyond 250,000 inch pounds. 95% efficient.

### Lubrication

All RXT gear reducers are factory filled with food grade synthetic oil. With synthetic oil, the lubrication interval can be as high as 20,000 hours. Applications with severe ambient temperatures, dust or moisture will have more frequent maintenance schedules.

On RXT-4 through RXT-9 series gear reducers, expansion chambers are added to manage thermal transfer and allow for thermal expansion of lubrication media.

### Gearing

Gears are produced from high strength steel forgings, with case hardened, precision finishing. Precision grinding of skive hobbing is the gear finishing process. Gears are rated for infinite life.

**Gear quality level:** AGMA Class 11 for output side, AGMA 13 for input side.

**Gear hardness:** 58-62 Rockwell C.

**Gear finish:** High speed gears are ground, low speed gears are skive finished post hardening.

### Housing

Design Concept: The single piece housing has been designed and engineered to optimize the alignment of all gears and bearings, promoting better gear mesh. With all of the main drive train components contained in a one piece housing; bearing bores, pilots and registers are machined in one step to insure the highest level of accuracy.

As part of this design philosophy of a one piece gear housing, engineered and dedicated fixtures are used to hold the castings rigidly, further promoting accurate machining of the bearing bores and gear alignment.

The number of openings and covers are minimized to reduce the number of possible leak paths. Covers and openings are unstressed access panels and positioned with large pilot diameters, further reducing the potential for leakage.

All bearing bores are continuous, non-split designs, eliminating bolted connections and seams. This design improves overall bearing support and maximizes bearing life by eliminating stress risers on the bearing face.

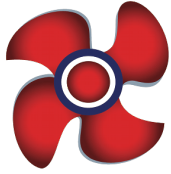
The standard housing material is Class 35 Cast Iron featuring heavy wall sections. The internal surfaces are primed to seal the casting process and fill any surface irregularities.

### Oil Seals

The low speed oil seal on the output shaft offers four levels of protection. It has two sealing lips, a dust lip and a grease chamber. The grease chamber is an additional barrier by protecting the inner seal from damage and prevents external dust or moisture from attacking the inner lip seals.

The grease also provides lubrication to the inner seal lips, reducing friction and heat and preventing dry cracking of the oil seal faces.

As part of the sealing system, output shaft finishes are tightly controlled. Surface finishes of 12-24 rms are maintained.



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## Breather Design

The breather is a check valve design that allows internal pressure to exhaust during operation and warm up, but prevents ambient air from contaminating the lubrication media when the gear reducer cools down.

Background information on the breather design: On intermittent use, the gear reducer heats and cools, causing expansion of the lubrication media. If not able to expand, internal pressure will rise and then rupture the oil seals.

Upon cooling, the lubrication media contracts, drawing in moisture, dust and ambient air. As mineral oil is hydroscopic, a small amount of moisture will cause foaming and a degradation in lubrication quality.

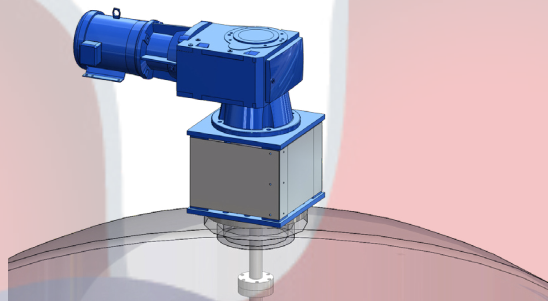
A spring presses a ball against a machined opening until the heating of the oil and air in the reducer exceed 2 PSIG. Above 2 PSIG, the spring is compressed and the ball is displaced, allowing the pressure to exhaust. When internal pressure declines past 2 PSIG, the spring opens and the ball returns to the closed position.

A major advantage of this design allows for us to ship the gear reducer factory filled with oil without risk of moisture contamination or fouling the drywell.

## Bearings

Oversized, double row spherical bearing to absorb high overhung loads, thrust loads and increase overall low speed bearing life. The spherical bearing design facilitates impeller shaft alignment, preventing run out.

AGMA Service Class III: 2.00 service factor on mechanical input horsepower. Reference AGMA Standard 6010 and 6009. Cleveland Mixer Design Practice engineers effective service factor often in excess of AGMA Class III ratings.



## Stainless Steel Paint

The RXT series features a polyurethane paint with 316SS stainless flakes. It is designed for USDA H1 incidental contact and is rated for both indoor and outdoor applications. It is heat and humidity resistant based 500 hours at 100F and 100% humidity.

The solvent based polyurethane provides excellent durability and corrosion resistance. It is rated excellent against industrial solvents such as gasoline, acetone, laquer thinner, lubricants and cutting oils. The paint when cured has a 2H hardness but has excellent impact resistance.

## Mixer Shafts, Couplings & Impellers

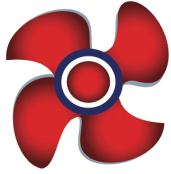
Mixer shafts are of adequate diameter to withstand forces of torque and bending moment. Agitator shaft stresses using combined torsional and bending loads do not exceed 10,000 psi. Shaft with non stabilized impellers operate at less than 70% of the first critical speed. In case of a stabilized impeller system, shaft rotational speed does not exceed 75% of the first critical speed.

For overhung shafts, only Pump Shaft Quality is used. Dimensional tolerance is to be +0.000/-0.003". The shaft run out tolerance is to be 1/32" of run out per 60" of shaft length. Shafting finish quality is 32 ra.

All support and impeller connection areas are concentric to within 0.010" TIR.

The mixer shaft fits into the speed reducer by means of a hollow quill reducer shaft and direct connection. Mixer shaft is retained in quill by top mounted bolt and cap. Cap plate assembly is protected against corrosion and debris by a top mounted cover, wash down rated.

In certain high torque or high overhung load applications, a keyless rigid coupling is used in place of the hollow quill. In this design, the solid output shaft of the gear reducer is rigidly coupled, without keys, to the impeller or extension shaft. No fretting nor the 33% loss in shaft strength as with a keyed shaft is experienced with this new coupling design.



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Removable in-tank couplings are available as options depending on the application. The tapered bore coupling has a flange mount with designs for either high or low torque applications. Bolt circle and mounting hardware specifications are determined by invested torque amounts.

Optional Shaft Catcher design allows for agitator shaft to be supported on mounting flange, allowing for gear reducer maintenance without draining tank.

## Impellers

Impellers are to be applied per process requirements. Standard three bladed hydrofoil impellers are designed for turbulent and transitional flow regimes. Axial flow and radial flow impellers are offered as options for laminar and transitional flow regimes or where applications require greater invested torque or shear action.

Impeller hubs and impeller blades are designed according to invested torque. In no circumstance will impeller assembly stresses exceed 12,000 psi on bending and shear forces.

Impeller hubs are keyed to the shaft with a 'gib' or retaining bolt to resist impeller thrust forces.

## Mounting & Positioning

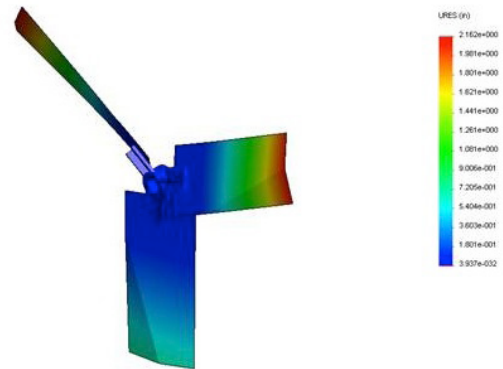
The mounting of the mixer shall be specified by 3D drawings equipped with mounting bolts for flange, beam or plate mounting.

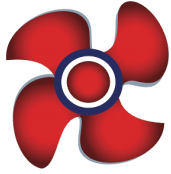
## Guarantee

**Mechanical Warranty:** For RXT mixers, it is for one year from date of installation or 18 months, against all mechanical defects.

**Process Guarantee:** The units should be installed on the customer's specified process for a period of twelve months after start up. The customer is responsible for supplying complete process data such as application density, viscosity, the nature of the fluid (Newtonian, pseudo-plastic, thixotropic, etc.), liquid levels, process operation details, temperature, pressure, etc.

The maximum period for the process warranty will extend to 18 months after original shipment.





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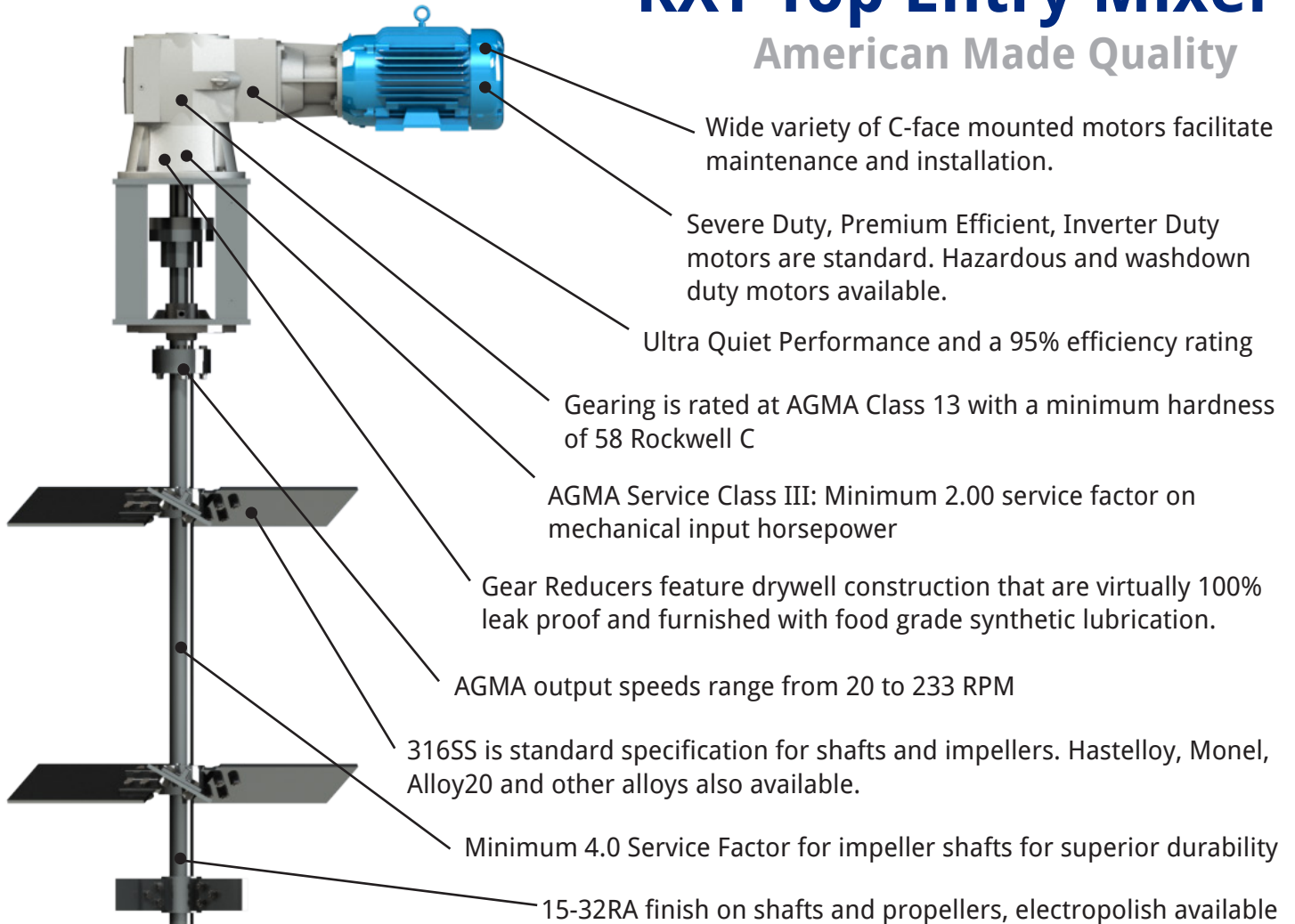
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## RXT Top Entry Mixer

### American Made Quality



**Why choose Cleveland Mixer  
for all your fluid process  
applications?**

- Application Engineering - Your process goals are our top priority
- Design Flexibility - Let our engineering team create solutions for you
- Industry leading durability
- Industry leading 3 year guarantee

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