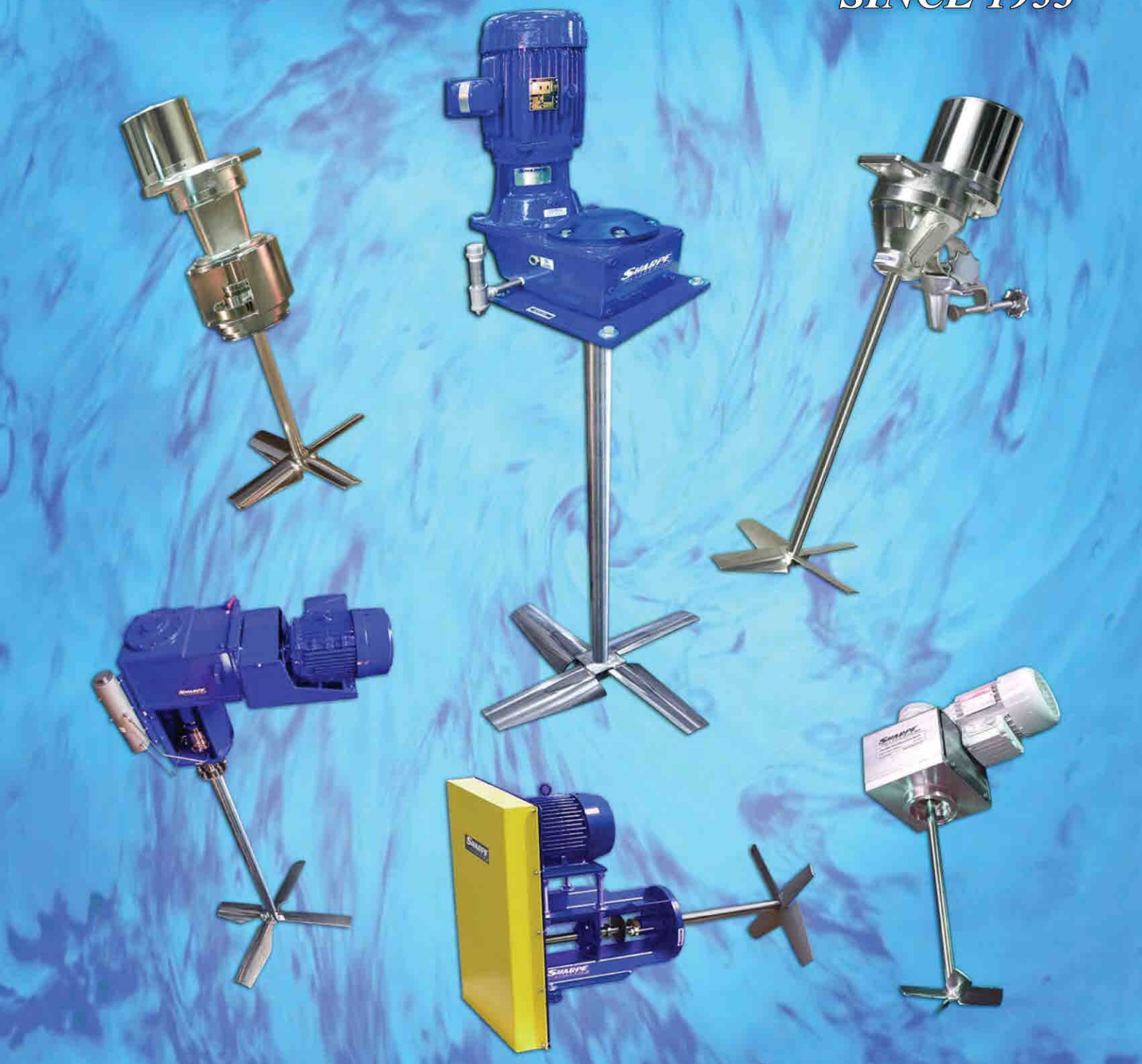
SHARPE MIXERS

SINCE 1953



when quality counts...

www.sharpemixers.com (800) 237-8815 (206) 767-5660

Introduction

Founded in 1953, Sharpe Mixers has dedicated over half a century to liquid mixing solutions. Innovative problem solving and continuous advancement in mixing technology have earned us recognition as a "preferred choice" agitator manufacturer.

Good reputations don't come easily. Ours has been forged through a commitment to uncompromised quality in engineering, manufacturing and service. Each customer has different needs; each process different requirements. Our customers come back because of our ability to meet those individual needs and optimize their processes. Sharpe Mixers' experience in fixing endless mixing problems has built a huge knowledge base that guarantees our solution will work right the first time.

This brochure is a snapshot of the many strengths of Sharpe Mixers: our extensive experience, applications knowledge, advanced technology, manufacturing capability, wide range of standard equipment and limitless custom designs- all of which will be used to provide the optimum design to fit your specific process.

From start to finish, it is our goal to provide the highest quality equipment, prompt and dependable service and the best value for your dollar.

Jay G. Dinnison

President, Sharpe Mixers, Inc.

Applications & Technology

Mixing applications are as varied as the fluids being mixed; what works for one product will not for another. Decades of experience allow us to recognize the best way to address a mixing problem, and Sharpe's many proprietary computer programs draw from thousands of parameters to arrive at the optimum solution. Mixing scale, time to uniformity, torque / unit volume, bulk fluid velocity, horsepower / unit volume, momentum and many other analyses methods are considered. Product rheology, tank geometry, retention time, pressure, temperature and dozens of other process details all come into play with Sharpe Mixers designs.

Applications typically fall into one of the following categories:

Liquid/Liquid is the most common mixing process and can range from simply maintaining uniformity in a storage tank to vigorous mixing in a reactor. Mixers are also used to improve heat transfer (such as with jacketed vessels for cooling or heating) and to maintain fluid motion as is common in the dairy industry.

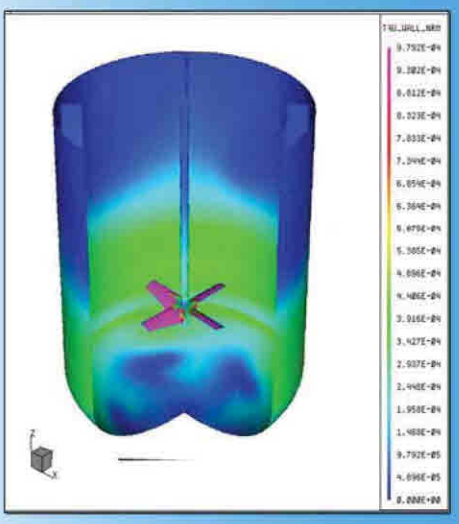
Liquid/Solid applications include dissolvers, crystallizers, mineral extractions and sand washing. Food processing may also require solid/liquid mixing to maintain uniformity of products such as salsa and salad dressings.

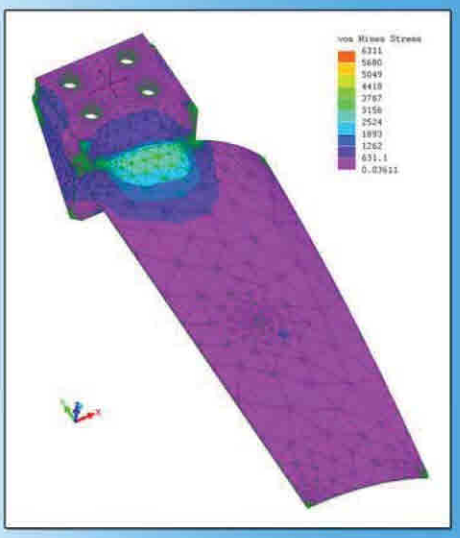
Gas/Liquid mixing (or gas dispersion) is used to maximize mass transfer (e.g., dispersion of air or oxygen into a fluid as in aerobic fermentation or aerobic digestion in waste water treatment). Also used for desorption in stripping or degassing processes.

Gas/Liquid/Solid mixing includes processes that require gas to liquid mass transfer, when maintaining solids in suspension is also needed in the reaction. An example of this is flue gas desulfurization for coal fired power plants.

If you are unsure of how mixing applies to your application, Sharpe can analyze your product in our lab, determine the rheology and perform pilot scale testing to determine the optimum solution for a successful mixing system. Bench top mixing and pilot plant tests can also be performed to determine appropriate scale up parameters. Computational Fluid Dynamics and FEA modeling, lab testing and scale-up analysis can also be used to refine designs.

Contact your local representative or one of Sharpe Mixers experienced applications engineers to review your process and determine the best "mix" of impeller and tank geometry for the most cost effective solution.





Industries

Each industry has different requirements and unique nuances beyond just the mixing operation. Sharpe Mixers' experience spans over half a century across a wide range of industries and applications, allowing us to specialize and fine-tune mixer designs for specific industries. Our standard procedures include meeting special requirements for materials or polish, electropolish, coatings, unique seal or motor specifications, PMI, CoC, certified testing or other documentation; meeting the special needs of the customer is job #1. Sharpe understands the "standards of the industry". Whether mixing nuclear waste, molten lead, food or pharmaceuticals, Sharpe Mixers will provide quality mixing equipment that meets the distinct needs of the process.

Chemical Process

Extensive application knowledge, laboratory testing, computer analysis, and product development allows Sharpe Mixers to offer a wide variety of agitation solutions to the CPI. We continue to offer state-of-the-art equipment to solve the many complex process requirements across global chemical processing industries.

- Liquid-Liquid, -Solid, -Gas Blending
- Miscible and Immiscible Liquids
- Solids Suspension and Dissolving
- Chemical Reactions
- Heat Transfer
- Mass transfer
- Polymerization

Food & Beverages

The Food & Beverage Industry brings application challenges and equipment sanitation requirements to the agitator supplier. Sharpe's mixers incorporate special details to meet FDA, USDA and 3A standards for clean-ability.

- Low Viscosity and High Viscosity Blending
- Dispersion & Dissolving
- Solids Suspension
- Cooker Kettles
- Cereal Cookers
- Crystallization
- Hydrogenation
- Fermentation

Pharmaceuticals & BioTech

The Pharmaceutical & Biotech Industries bring the term "clean-ability" to the next level. Sharpe Mixers specializes in this equipment and was a member on the BPE committees. Sharpe created many lines specifically designed for these markets incorporating easy-to-clean components, stainless steel motors and drives, dry-running CIP/SIP mechanical seals, and polished and electro-polished finishes to 5 Ra.

- Liquid-Liquid, Liquid-Solid
- Liquid-Gas Blending
- Buffers & Media Prep
- Reactors
- Purification
- Fermentation

Mining & Minerals

Sharpe mixers are processing precious metals, high value minerals and coal at installations worldwide. Strong application experience coupled with conservative mechanical design results in higher efficiency agitation and outstanding equipment longevity.

- Slurries
- Suspensions
- Extraction
- Separation
- Precipitation
- Flotation
- Leaching

Pulp & Paper

Beginning in 1953, many of Sharpe's first mixers were for the Pulp & Paper industry. Thousands of mixers later, Sharpe Mixers remains a preferred choice. Proprietary VQP and momentum flux analyses are utilized to create durable and efficient mixers for Pulp & Paper.

- Stock Chests
- Blow Tanks
- Broke Chests
- Couch pits
- Bleaching
- High & Low-Density Stock Chests
- Chemical Make-up
- Coatings

Water & Wastewater Treatment

Sharpe combines advanced impeller technology and conservatively designed drives to provide cost effective solutions for the many applications throughout Water and Waste Treatment.

- Industrial & Municipal Treatment
- Chemical Prep & Dissolution
- Equalization & Neutralization
- Aerobic & Anoxic Treatment
- Potable Water
- Flocculation
- Sludge Blending & Storage

Power & Utilities

Sharpe Mixers offers a complete line of mixing equipment for the many demanding applications in the power industries. Over 1000 Sharpe top and side-entry mixers are successfully operating in Flu Gas Desulphurization processes around the world.

- Boiler Feed Water
- Equalization and Neutralization
- Flue Gas Desulfurization
- Slurries and Suspensions
- Coal Prep & Washing
- Coal Dust Control
- Sludge blending & storage

Portable and F-Series

Sharpe's M5 Portable and F-Series mixer lines represent some of the smallest mixers we build, but in many ways the most significant. Because these are our greatest volume line, we have taken great steps to create the highest quality mixers and offer the best value for your dollar. This mixer line has continually been refined and improved so every component has significant advantages over other mixers on the market.

- White powder-coated drives for maximum durability (standard M5 line)
- All-Stainless drives for ultimate paint-free corrosion protection (all-stainless M5 line)
- Non-proprietary 56C frame motors are stocked in nearly every configuration, including stainless, air, white wash-down, XP, Chem Duty, 1 and 3-phase, 60 and 50-hertz, 110, 203, 460, 575 volts. Many other designs available.
- Modular construction allows for easy changes with interchangable components
- Shaft coupling is enclosed inside a sealed housing for safety and protection
- All M5 models include a Viton lip seal in the nosecone/drive spool to protect the shaft internal parts from corrosion, and prevent possible contamination to the process.
- Most models are stocked for quick shipment, including all-stainless and polished units

Download the entire portable brochure from our website for more information including a selection guide, sizing charts, weights and dimensions. ***www.sharpemixers.com***

Clamp & Fixed Mount Mixers

Heavy-duty drive available in powder-coated aluminum or stainless steel (shown) for maximum durability

NEMA 56C frame motors; available in TEFC, Chem-Duty, Wash-Down, XP, stainless steel, air and other designs

Hardened and ground AGMA quality-10 gearing guarantees quiet operation and long life (gear-drive models only)

SS316 mounting clamp is guaranteed for life against breakage

Shaft coupling is sealed inside a gasketed nosecone to prevent corrossion and possible accidents

Patented Quick-Lock mounting system allows for easy mounting and precise positioning without tools

Food-grade Viton lip seal below the bearing and coupling prevent moisture and dirt from reaching internal parts

Oversize SS316 shafting is precision machined to minimize whip and vibration

Energy efficient HYF-218 impellers or marine props available in bead blasted or polished finishes

Sharpe's All-Stainless line (above) represents the ultimate in sanitary mixers, far exceeding the requirements for "paint-free" equipment. The fully sealed drive protects internal parts and ensures that no contamination can be caused by the mixer drive itself. Standard aluminum models (opposite page) offer similar features with a nearly indestructible powder-coated aluminum housing. Regardless of the model, you can be confident that your Sharpe Mixer will look and run like new after years of duty.

Top-Entering

E-SERIES
Worm Gear

NEMA or metric frame motors, c-face or foot mounted, in various speeds and enclosures.

Drives available with hollow or solid output shafts

N-SERIES
Helical Gear

Flexible input coupling

Plate, flange or ferrule mounting standard. Custom designs also available to fit your tank

durable 2-part epoxy finish

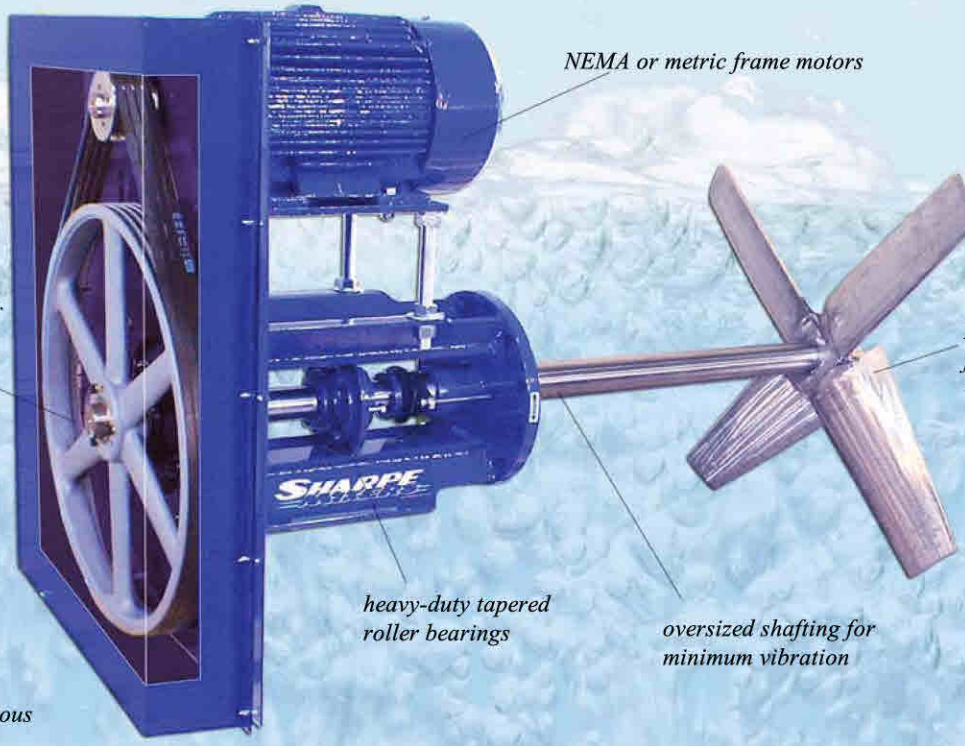
High strength hollow shafting furnished standard on larger equipment. Solid shafting furnished for smaller shafts or upon customer request

At Sharpe Mixers we don't make your process fit our mixers; we build the mixer to fit your process. We manufacture a huge variety of mixers from 1/6 to 300 horsepower. Above are two of our most popular mixer lines, shown with plate mounting for open-top tanks. All lines are available with flange or ferrule mounting, vapor seals, stuffing glands or mechanical seals, endless impeller configurations, and built in a wide variety of materials (options, pages 10-15). All Sharpe Mixers equipment is built to exacting standards of fit and finish, quality and durability. Built without compromise, a Sharpe Mixer will be the simplest, most trouble-free equipment in your plant.

Shafting in diameters from 3/8" to 12", lengths to over 50'.

Numerous impeller designs are available, including hydrofoil, axial and radial flow, anchor, helix, hi-shear discs, or custom designs to fit your process

Side-Entering



V-SERIES Belt Drive

standard 3V, 5V or 8V drives with QD bushings. Cog belts also available

N-& E-SERIES Gear Drive

in-line helical or right-angle worm drives available

Sharpe's primary goal when developing a mixer line is to make the equipment simple and easy to maintain. All access areas are large and open for servicing. Standard shaft retraction (to shut off tank leakage during seal servicing) is the simplest in the industry and can be done without disturbing the drive. Seal parts, shaft bearings and drive components on the mixer are replaceable without removing the mixer or draining the tank. Motors, bearings, seals and other parts are non-proprietary and can be sourced from your preferred local supplier. Heavy-duty tapered roller bearings support the mixer shaft and a minimum 1.5 service factor is used on all drive components for durability. Mixer housings are fabricated from steel and line bored for perfect alignment and quality. Available in a wide range of sizes, speeds, seal designs, and alloy construction.



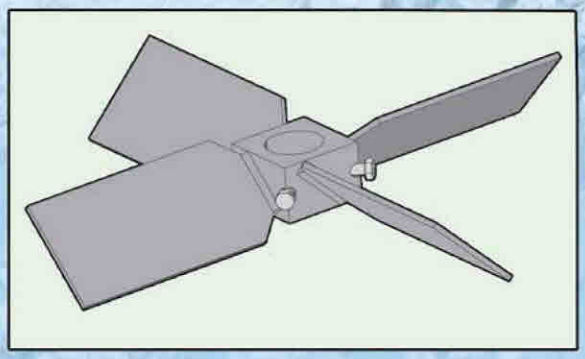


Impeller Technology

No single impeller can perform well in all applications. Sharpe Mixers has spent decades testing different impellers in various processes to determine performance traits; modifying and refining the designs to improve specific characteristics. The result is a family of standard and specialized impeller designs that are optimized for specific processes. Shown on these pages are the most popular impellers, including industry standards and some of our proprietary designs.

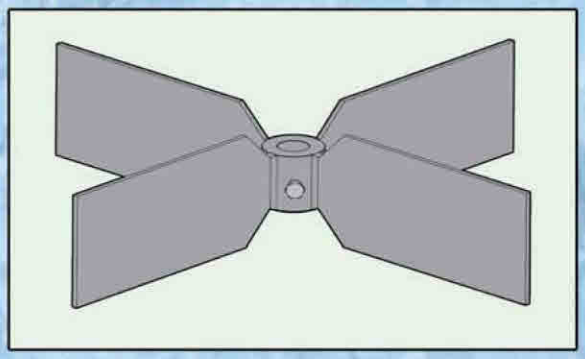
AFT-455

Conventional 45-degree flat blade axial flow turbine impellers create high turbulence in lower viscosity and better shear in higher viscosity liquids than more efficient hydrofoil impellers. Generates good axial flow in higher viscosity liquids (N_{Re}< 200).



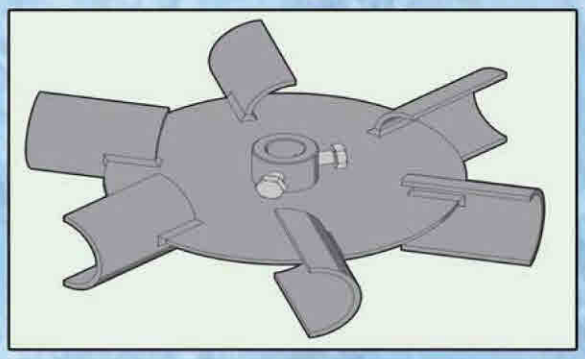
FBT-700

Flat blade radial flow impellers create high flow and shear rates, but draw more power than pitched blade impellers. Best for dispersion at high tip speeds (>30 fps), and blending immiscible fluids. Also used as "tickler" impellers to mix low liquid levels.



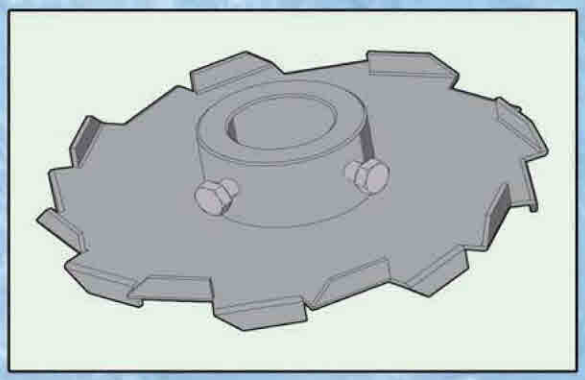
CBD-730

The "Smith" radial flow disc impeller provides necessary shear for good gas dispersion, and the disc design provides better gas hold-up and reduces short circuiting. The cupped blades create larger bubble surface areas to improve gas transfer.



HSD-800

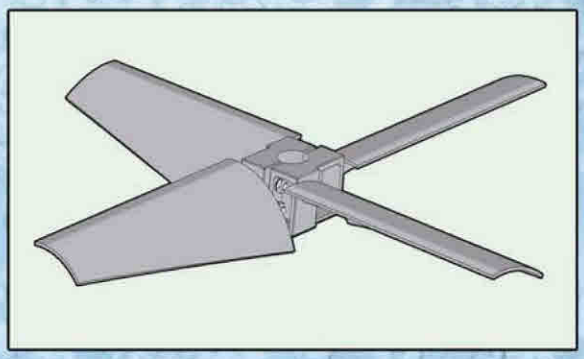
The"Cowles" high shear disc impeller creates high-shear to prevent clumping, wet out powders, reduce particle size and emulsify. Best when operating at a high speed. Can be used in conjunction with an axial impeller to provide tank circulation and high shear.



Sharpe's exclusive family of Hyflo impellers was developed with the assistance of aerospace engineers to obtain the highest pumping efficiency; more flow for less power. The Hyflo family includes unique models for specific applications, such as the HYF-318 for pulp & paper, the HYF-518 for aeration and higher viscosity blending, and many others. We have built endless specialty impellers to meet unique process requirements, including hybrids, impellers with folding blades, weedless blades, articulating arms, variable pitch, and many more. We can also duplicate an impeller design preferred at your plant.

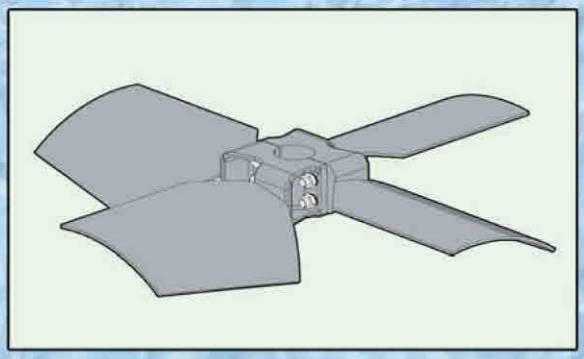
HYF-218

"Hyflo" hydrofoil impellers generate greater flow for less power. The HYF-218 is best for low viscosity products. Provides double the flow of pitched blade turbines at the same power. Low blade angle and hydrofoil blade shape reduce shear rates.



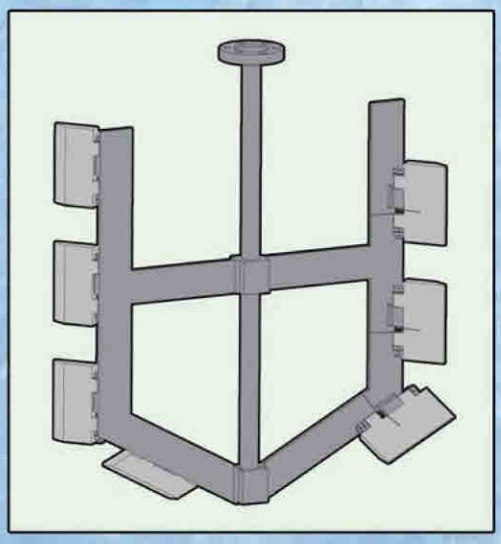
HYF-518

The wide blade "Hyflo" high-efficiency hydrofoil is best used on medium viscosity (N_{Re}< 500) products. Provides equal flow at half the power of common pitched blade turbines. The high-solidity design is also optimum for gas-handling applications.



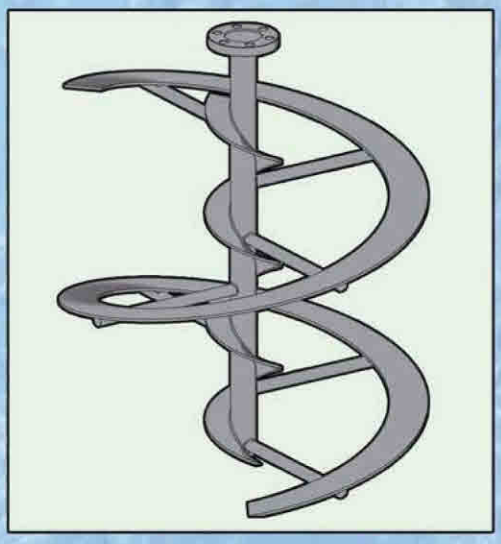
ANC-101

"Anchor" impellers are used to mix higher viscosity products (N_{Re}<200). Add scraper blades to clean vessel walls, or a separate high-shear mixer to improve flow/shear.

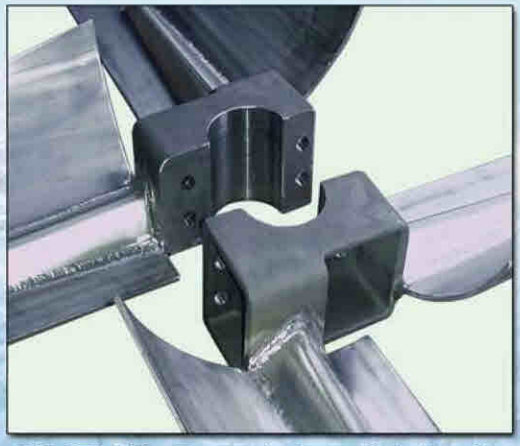


HLX-102

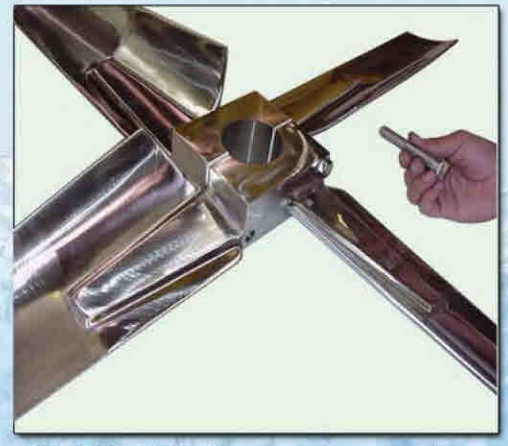
Single and double helix impellers are best for blending viscous liquids (N_{Re}< 50). Can also be paired with anchor, auger, axial flow and/or scraper blades.



Impeller Assemblies / Hub Options



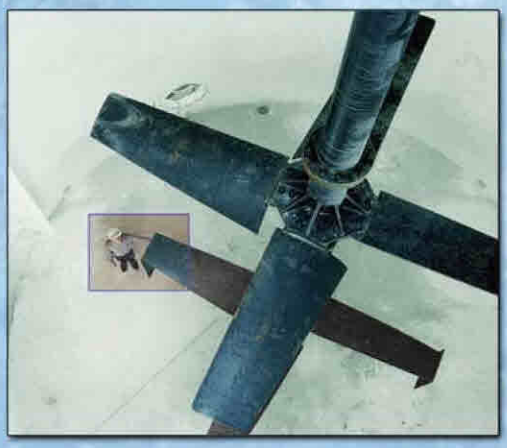
SPLIT HUB- Our exclusive split hubs allow easy installation, positioning & removal. Blades are welded to the hub for greater strength- no more broken blades!



SPLIT BLOCK- An easy-clean version of our split hub. Also available polished with food-grade gaskets and o-rings for sanitary applications.

FOLDING BLADES- Another Sharpe exclusive. The blades collapse to a small diameter to fit through a nozzle, and open up to full size when operating.

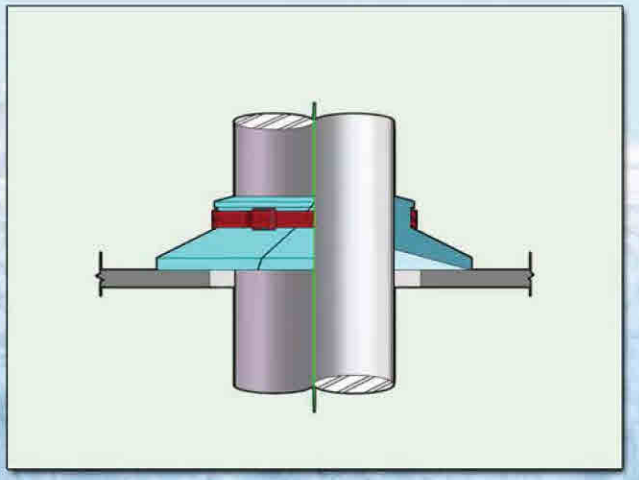
ONE-PIECE- conventional one-piece hubs are used on smaller impellers with solid shafts. Torque is handled by a key and setscrew (Titanium HYF-518 shown)



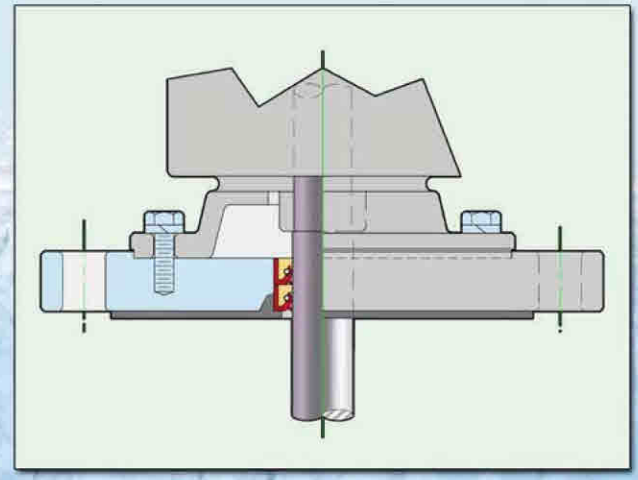
BOLTED- Some designs require the blades to be bolted to a welded hub. Usually reserved for larger impellers & exotic alloys (180" HYF218 shown)

ALL-WELDED- Welding the impeller to the shaft may be required on polished equipment, or when the parts are coated with Halar, Kynar or rubber covering.

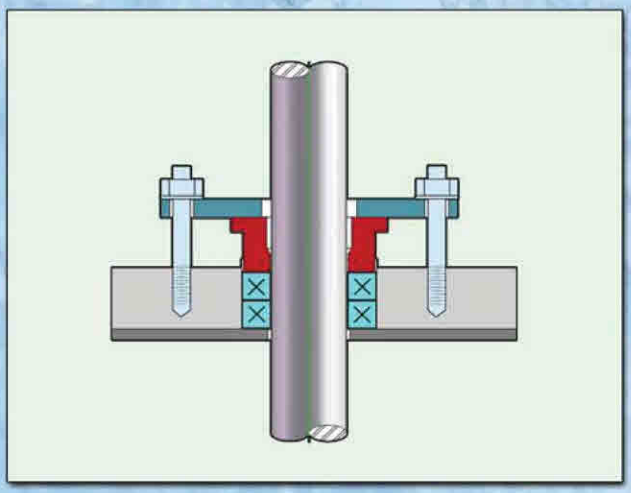
Shaft Seals



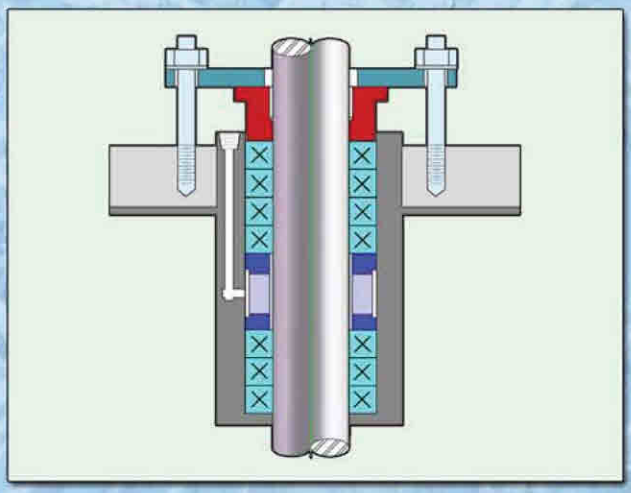
EXCLUDER SEAL- This exclusive Sharpe design is split for easy installation and removal; a simple & inexpensive vapor seal. Available in EPDM & Viton.



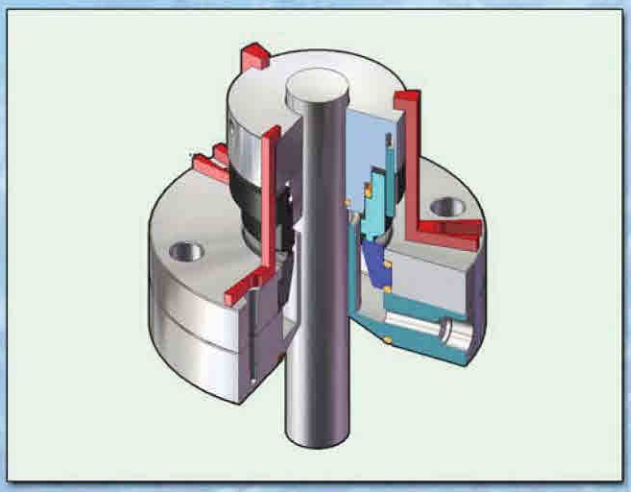
VAPOR FLANGE- A simple vapor seal for flange mounted mixers. Lip seals are supplied in Buna, Viton, Kalrez or Teflon. Split designs also available.



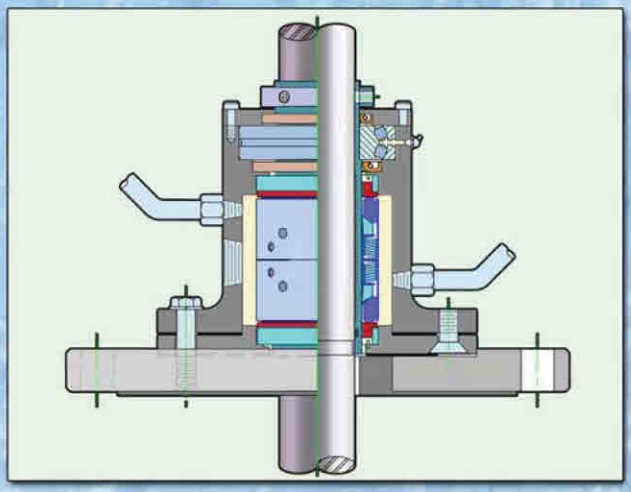
LOW PRESSURE GLAND (2-ring stuffing box)- This industry standard uses two rings of packing to handle low pressures up to 15 psig. Also available for remote mounting.



HIGH PRESSURE GLAND (stuffing box)- This simple design is available in many configurations, for grease lube, water flush or self lubrication. For pressures up to 150 psig.



DRY-RUNNING MECHANICAL SEAL- This durable seal requires no lubrication or maintenance and can handle pressures up to 200 psi. Shown with optional debris well for sanitary CIP service.



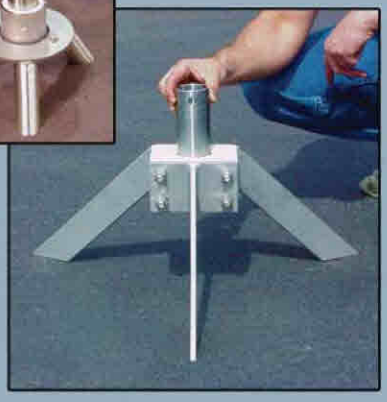
UNIMECH MECHANICAL SEAL- Sharpe's exclusive UniMech seal design includes a bearing to minimize runout and extend seal life. Interchangable with many common single & double seals.

Shafts
Couplings
Steady Bearings

Shafting- Shaft design is critical when engineering a mixing system and Sharpe goes to great lengths to arrive at the best configuration. Proprietary computer software allows us to optimize the design, and specialized tooling allows us to build the highest quality product. We specialize in hollow shafting, which is stiffer and lighter than the equivalent solid shaft. The lighter weight reduces the loads on the mixer drive, allows longer shaft designs, and makes installation a breeze. Precision machined solid shafting is used on smaller equipment and side-entry mixers.

Shaft Couplings- Sharpe offers many different coupling designs to fit specific applications, including split, flanged, threaded, sanitary, easy-clean and many others.

Steady Bearings- Sharpe's hollow shaft designs, heavy-duty drives and other details allow us to avoid using steady bearings on the majority of our mixers. However, when the extra-tall tank requires it we have many quality arrangements to meet the need. Tripods, spiders, sanitary bearings; all designed for long life and easy maintenance.



Accessories and Options

Sharpe Mixers' mixing equipment is installed in a nearly infinite number of industries and applications. We offer a wide range of options and accessories to meet specific requirements. Listed below are some of the more common options, but we specialize in custom designs. Our goal is to provide exactly what is needed. Let us know what you want, and we will build a mixer that is taylor-made to fit your process.

Mixer Stands

Designed to be the best in the industry, Sharpe's mixer stands are unparalleled in quality and ease of use. Air-lift, electric-lift and manual-lift stands are available in stainless steel or epoxy coated mild steel construction. Available options include locking casters, glides, tank positioning arms & straps, counterweights, anti-tip ballast tanks and more. Download the complete brochure for more information at www.sharpemixers.com

Motor Choices

Your choice of motors and options is nearly endless, or we can provide the specific type used at your plant. We stock hundreds of motors for quick shipment, including TEFC, wash-down and all-stainless. If a special motor is required, send us the specification, and we will include it in the mixer design.

Controls

Various variable speed controls are available in wash-down enclosures and stainless steel designs. Sensors and tachometers can also be incorporated in the mixer drive to mate with plant control systems.

Coatings and Polishing

Coatings and polishing can be a nightmare if done improperly. Sharpe has decades of experience providing a wide range of finishes from abrasive-resistant rubber coverings to 5Ra pharmaceutical polished & electropolished surfaces. You can be confident the product you receive will be the highest quality available.

COATINGS

- Halar
- Rubber
- FRP
- Teflon
- Kynar
- Epoxy

ALLOYS

- SS316
- SS304
- SS317
- Mild Steel
- Titanium
- AL6XN
- 254SMO
- Alloy-20
- Hastelloy
- Ferallium
- 2507
- 2205
- Inconel

POLISHING

Many levels of polishing are available, including simple bead blast for easy-clean properties, polishing from 32 Ra to 5 Ra and electropolish. Couplings and impellers are available in various easy-clean, FDA and pharmaceutical designs.

Specialty Equipment

Sharpe Mixers is a manufacturer of industrial liquid mixing equipment, but primarily we are a design engineering firm that specializes in solving unique mixing problems. Many customers come back to us because we offer custom-made solutions that they cannot get elsewhere. Although we utilize mass production when possible for standard components, many processes are best addresed with specialized equipment. Sharpe Mixers' team of application engineers and designers excel at creating custom equipment to optimize processes. If the requirement includes exotic alloys, coatings, polishing or a unique equipment design, our extensive experience will guarantee those requirements are met without compromise. Satisfying customer specifications (i.e., special testing, documentation, packaging, scheduling, painting, etc.) is foremost in our job description. Some of our specialties include:

- ✓ *All exotic alloys including Titanium, Inconel, Hastelloy, Nickel, Ferralium, Duplex alloys 2205, 2507, SS904, AL6XN, 245SMO, and many others*
- ✓ *Polishing for food, pharmaceutical, easy clean properties or show*
- ✓ *USDA / FDA / 3A approved mixers and all-stainless steel mixers*
- ✓ *Coatings: Halar, Kynar, Teflon, Rubber, FRP, etc.*
- ✓ *Multi-action mixer systems, dual action high-shear/low-speed anchors, folding and adjustable pitch impellers, wipers, foam breakers, etc.*

- FOOD AND BEVERAGE
- PHARMACEUTICAL
- PULP AND PAPER
- PETROLEUM
- BIOTECH
- CHEMICAL
- MUNICIPAL
- WATER & WASTE
- MINING
- FGD

Made In the U.S.A.

P.O. Box 3906 Seattle WA 98124
phone: (800) 237-8815
(206) 767-5660
email: sales@sharpemixers.com
www.sharpemixers.com

SHARPE MIXERS

Brochure# CB-92012