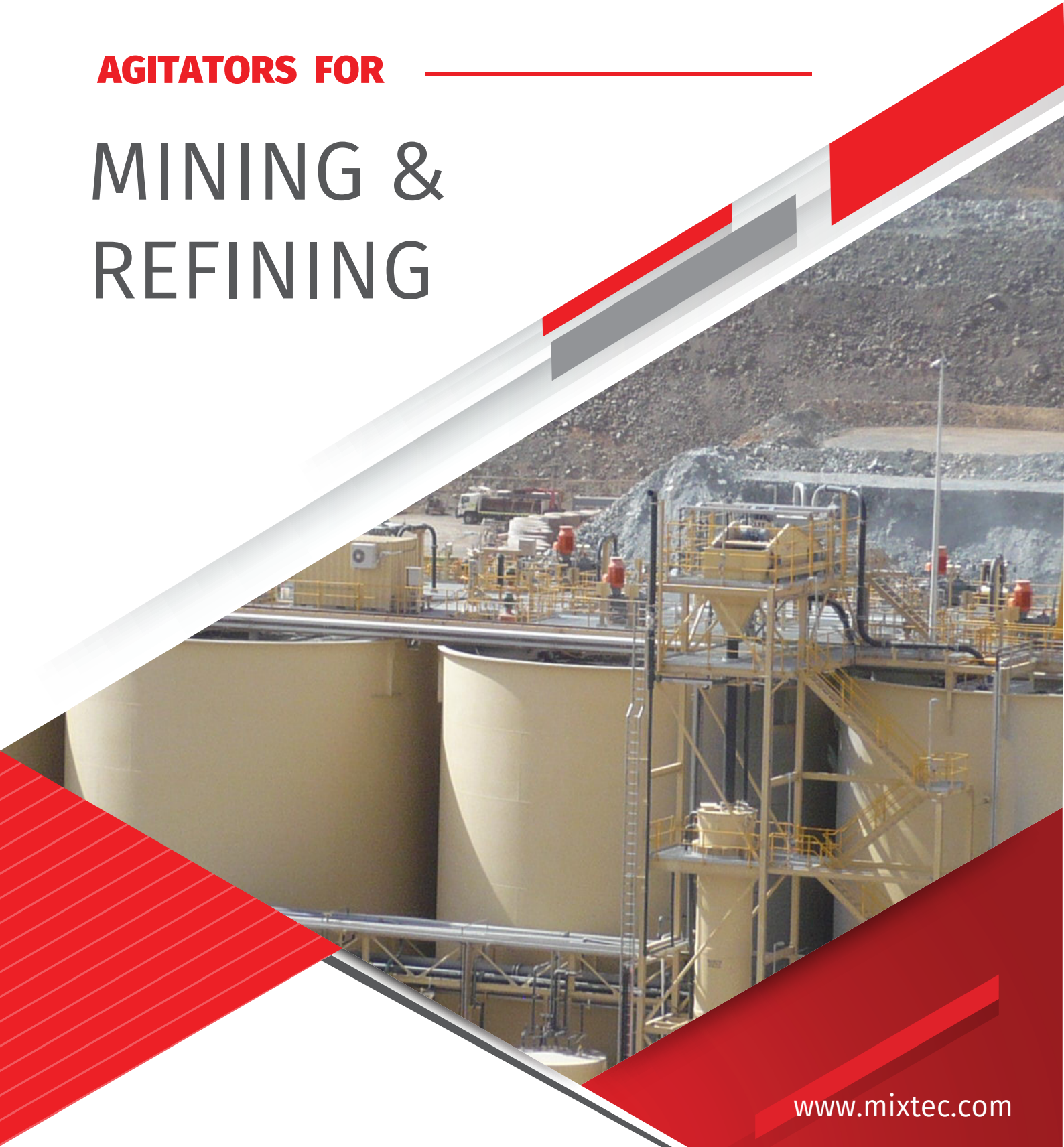


AGITATORS FOR

MINING & REFINING



www.mixtec.com

MIXTEC
FOR MIXING TECHNOLOGY



MIXTEC

FOR MIXING TECHNOLOGY

▶ THE AGITATOR SPECIALISTS

Mixtec's products are used in the mining and refining industry throughout the world. Advanced impeller technology has solved problems encountered during gold leaching, carbon in pulp adsorption, biological leaching, flotation, conditioning and attrition scrubbing to name a few of the numerous applications we service. No industry has benefited more from Mixtec's ability to refurbish and improve upon existing agitators than mining and refining, producing not only power savings but also increasing the operational life of existing mixers. This includes new impeller technology and its capabilities in the reduction of the loading of the mixer drive assembly and associated structures. Mixtec also offers full technical and maintenance support to all sites with their efficient after sales service. It is our priority to ensure we are available for site visits, installation inspections and hot/cold commissioning services.

As a global manufacturer of heavy duty agitators and associated services in the mining and refining industry, we pride ourselves on high quality, reliable designs and manufacturing capabilities. Each agitator is unique and custom designed for your specific requirements by highly trained design engineers and staff with decades of experience. Our wide range of impellers are expertly matched to our client specifications to all mining applications.

AGITATOR REQUIREMENTS

The mining industry has many varied process conditions and agitators seldom have to perform only one simple duty. Agitators for Mining applications are often combinations of:

- Solids Suspension
- Blending / High Tank Turnovers
- Heat Transfer
- Mass Transfer
- Adsorption
- Leaching
- Repulping
- Head Generation

We make it easy for our clients in the mining, chemical and processing industries to understand the advantages and limitations of each mixer to ensure every agitator supplied by Mixtec, has the capability and technology to carry out the process. The science of mixing is continually changing, and we make it our duty to ensure design parameters are understood by the people concerned with the agitator design and operation.

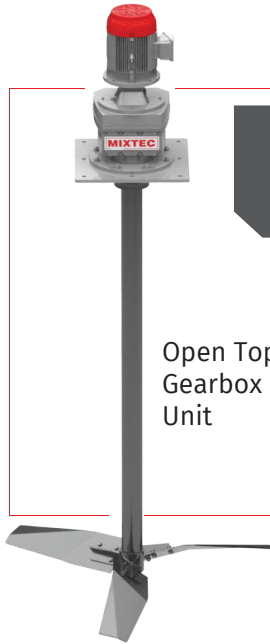


THE MIXTEC SERIES OF MIXERS



250 Series

Open or Closed Tanks
Direct Drive



1000 Series

Open Top Tanks
Gearbox Driven Unit



2000 Series

Closed Tanks
Including Sealing



Static Mixer

Inline Mixing



4000 Series

Large Industrial Gearbox
Driven Units

MODERN DAY MINING

Mixtec has successfully designed and commissioned mechanical agitators to operate in tanks larger than 6000 cubic meters, with mixing systems in excess of more than 38 tonnes and impellers manufactured over 7.6 meters in diameter and with shaft lengths of over 21 meters.

For such applications, Mixtec's Series 4000 heavy-duty mixer drives are available in standard models up to 450 kW. These rugged tried and tested mixers, coupled with features such as down the shaft air sparging and the high efficiency "EDICT" system ensure the best possible combination of mixer technology and proven equipment



SOLIDS SUSPENSION

One of the most common applications in the mineral processing industry is the suspension of solids. Grind size, material density, product viscosity and throughput, all play their part in agitator designs.

The efficiency of the agitators are also greatly influenced by the type of impeller selected. These factors combined with the operating conditions, such as start up in settled solids and varying liquid levels are all examined by experienced Mixtec Application Engineers to ensure you get the best possible agitator for the duty specified. We back our designs with product know-how, computational fluid dynamics work and a large track record of successful designs.



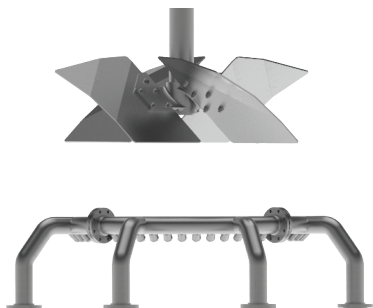
MIXTEC'S EDICT SYSTEM

The original Mixtec EDICT (Energy Distribution In Circular Tanks) system, developed in 2005 in our extensive Research and Development facility in South Africa has been trialed and successfully installed in literally hundreds of mining applications worldwide.

The system consists of our latest high efficiency, down pumping impeller together with the up-pumping impeller. This adds velocity to solids initially suspended by the lower impeller, by drawing them into the low-pressure area created and 'boosting' the upward motion to the upper portion of the tank. The solids then travel across the slurry surface to overflow or back down toward the flow generated by the lower impeller to repeat the cycle.

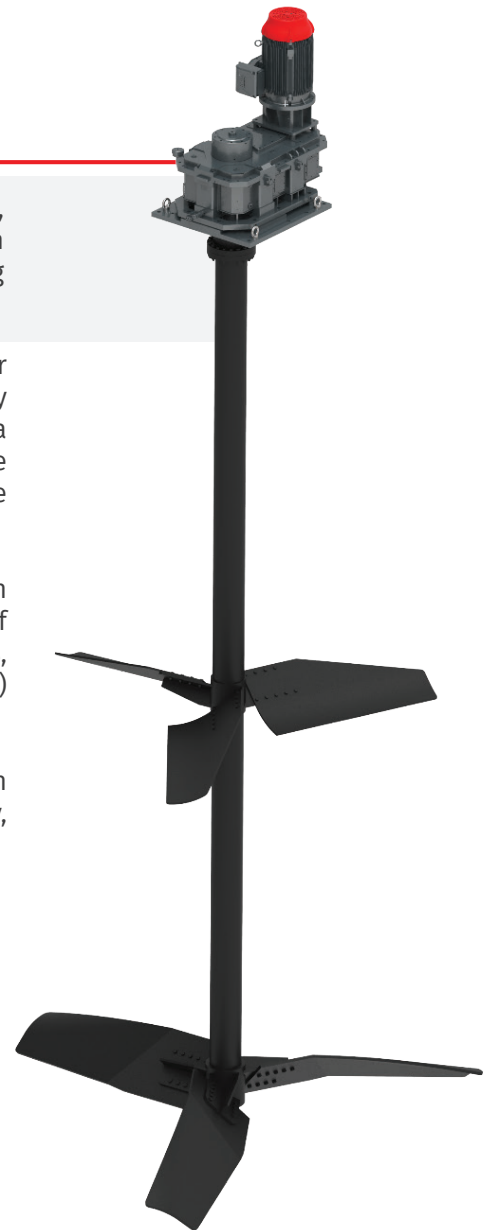
The system correctly utilises a combination of specially designed up and down pumping impellers to result in extremely effective and efficient suspension of solids. As with all our designs, various factors (tank dimensions, particle sizes, process temperatures, liquid levels, agitator impeller designs, shaft and drive) are calculated and sized for each specific application.

Mixtec is considered by many as, 'setting the benchmark' in power consumption and effective mixing equipment technology in the mining and refining industry, therefore it still remains the superior choice for agitation.



Advantages:

- Lower Power Requirements;
- Reduced loads on Gearbox, Shaft and Impellers;
- Greater interaction of Solids and Reagents/Gas due to opposing flows



APPLICATIONS

Homogeneous Solids Suspension: Requiring only 75-80% of the power of a power of a traditional Dual Down-Pumping impeller configuration.

Solids Suspension with Low Volume of Gas: Opposing flows further hinders gas from raising around the annulus of the tank resulting in greater gas hold up.

Solids Suspension with High Volume of Gas: Using our HA736, wide blade impeller, designed for high gas volume in addition to our EDICT System allows for greater gas hold up and improved kinetics within the tank.

CARBON IN PULP / CARBON IN LEACH



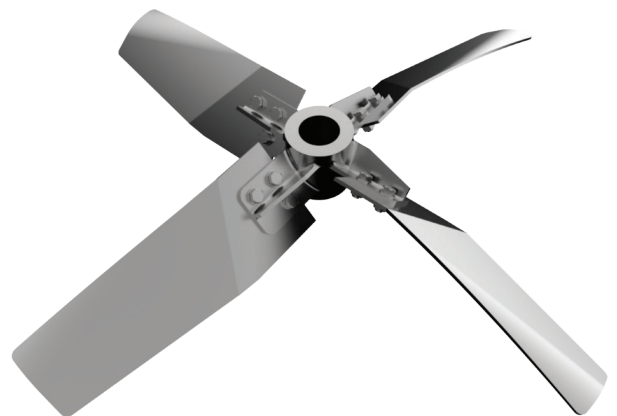
Mixtec has always been at the forefront of CIP and CIL mixing technology, with hundreds of such agitators in operation around the world, developing a track record few can match.

Continuous research and development around the improvement of new and existing impellers enables us to provide optimal designs using the latest technology such as CFD modelling to reduce power requirements whilst still providing or exceeding the desired results.

GAS DISPERSION IN CIL/CIP

The HA724 has been specifically designed for low-medium flow rate, gas dispersion applications and is used for solids suspension applications such as CIL/CIP circuits. This unique design ensures proper gas dispersion and generates a very aggressive flow rate which is required in many mining and industrial agitator applications.

Gas dispersion impellers allow for gas bubble size reduction by fluid velocity and not impeller contact. Therefore, the flow of air into the tank will determine the type and size of impeller. The HA724, superseding the widely used and most popular hydrofoil (the HA720) hosts many advantages including greatly reducing gearbox shaft stresses, higher flow for lower wear rates and improves gas handling capabilities.



IMPELLER DESIGN

Mixtec's impellers for the mining and refining industry offer numerous benefits:

- Higher pumping capacity with lower power
- Uniform gas dispersion
- Improved suspension of solids

DETOX/ CYANIDE DESTRUCTION



Most gold plants around the world are required by law to destroy cyanide and metal cyanide complexes in their tailings, prior to discharge from the metallurgical site into the tailings dam. Many plants destroy the cyanide in a contained area within the metallurgical site, so as to minimise the exposure of wildlife, particularly birds, to these toxic solutions.



GAS DISPERSION IN DETOX

PROCESS EXAMPLE USING SO² AND O²

Process slurry from adsorption tanks discharges by gravity in to the Cyanide Detox Feed Box and is distributed to the Cyanide Detox Tanks prior to it being sent to a tailings pond. The tanks are mechanically agitated with the use of Mixtec’s custom designed impellers specifically designed for gas dispersion applications.

Typically, compressed oxygen gas (O₂) and sulphur dioxide gas (SO₂) can be injected into the detoxification tanks. The agitator will disperse the bubbles evenly throughout the tank contents to promote efficient transfer of O₂ and SO₂ and into the slurry. During this process agitators will also provide uniform suspension of slurry solids.

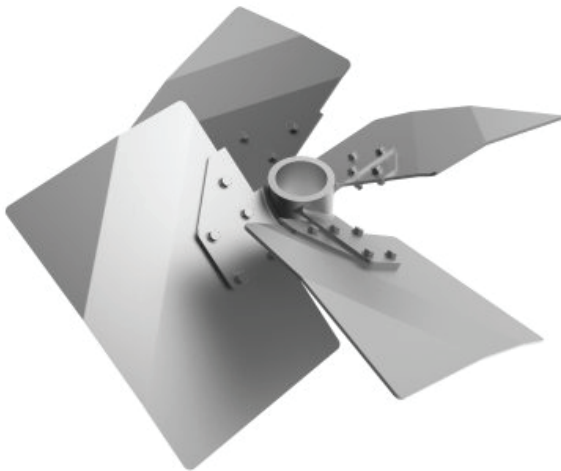
Cyanide Destruction can be achieved in many ways. In order to achieve our clients process results, we disperse the gas being introduced into the process. The volume of gas can be extremely large, requiring the use of Mixtec’s HA736 and HA724 impellers. The standardised, HA736 has been specifically designed for high pumping rates such as cyanide destruction. Although there are many ways cyanide destruction can be achieved, the use of agitators is a preferred standard amongst many plant designers. This is an area where Mixtec specialises in and adds significant value through tried and true design procedures accompanied with an impressive installation list of some of the largest cyanide detox agitators in the world today.

Cyanide destruction agitators installed internationally:

Indonesia	Cote d’Ivoire
Burkina Faso	Mali
Mexico	Ghana
Australia	Zimbabwe
Kyrgyzstan	Senegal
Columbia	Argentina

BIOLOGICAL LEACHING (BIOX®)

The BIOX® process, which pre-treats refractory sulphide gold ores such as pyrite, arsenopyrite and pyrrhotite, was developed to increase gold recovery rates during the metallurgical extraction process. The gold in these sulphide ores is encapsulated in sulphide minerals which prevent the gold from being leached. The BIOX® process destroys the sulphide minerals and exposes the gold for subsequent cyanidation, increasing recovery rates.



Mixtec's BIOX certified HA736 is the ideal choice for this application. Mixtec has produced various agitators for the largest biological leach plants. Our design functions of our efficient impeller system for biological leach application include:

- Providing a high primary flow volume
- Producing good in-tank flow patterns
- Ensuring high fluid velocities over the heat transfer and gas inlet surfaces

All these features were incorporated into the effective development of the HA736 to ensure excellent solids suspension, heat transfer and gas dispersion are achieved, whilst shear is minimised to prevent biological damage.

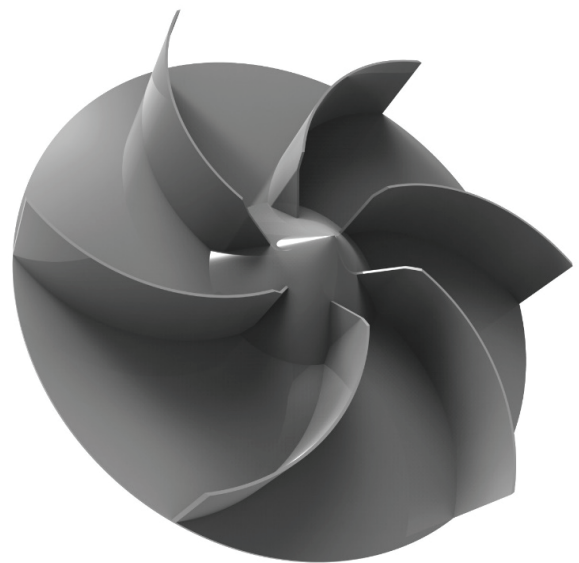
CARBON IN PULP / CARBON IN LEACH

At the heart of the solvent extraction plant are the primary pump mixers and secondary mixers.

Solvent Extraction is a mass transfer reaction where the metallic ion on the solution (Cu or Mo for example) is transferred from the aqueous phase to the organic phase due to chemical affinity with the extractants reagent.

It is clear that in order to improve the reaction kinetics, reaction surfaces play an important role, therefore droplet size is a key factor on the overall efficiency and valuable metal recovery.

Extensive mixing and pumping test work both in the laboratory and field has been essential to fully develop superior solvent extraction technology



AUTOCLAVES & PRESSURE REACTORS

An autoclave mixer duty includes gas dispersion, solid suspension and heat transfer. To satisfy these duties it requires experience and an intimate understanding of the desired process results and autoclave setup. With the aid of our extensive use of scaled up test work and CFD modelling, we understand the kinetics inside the autoclaves under operating pressures of 6000 kPa and temperatures over 200 degrees centigrade.

Sophisticated materials of construction are often required, which require special skills to ensure fitness for purpose, this includes titanium. Rugged cartridge seal housings ensure that minimum deflection and long seal life are selected to ensure reliability, and ease maintenance. Autoclave seals are available in two variants. One with a bearing to steady the shaft and impart the upward axial force into the mounting plate and the other without a bearing that allows the axial force up into the gearbox.

HIGH PRESSURE REACTORS

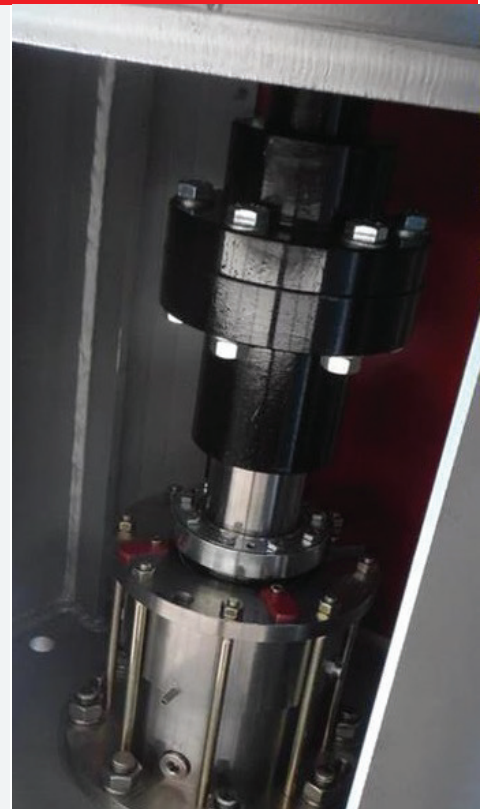
Mechanical Design

Sound process technology must be backed by conservative mechanical design that is both simple to install and easy to maintain. The standard drive configuration is possible up to 2000kPa and with the aid of an auxiliary seal bearing pedestal up to 6000kPa working pressure.

The standard Mixtec drive configuration includes oversized bearings and output shaft to accommodate the thrust loads from high tank pressures and to limit shaft run-out, thereby ensuring maximum seal life

Mechanical Seals

Single dry running mechanical seals are now available as well as double sleeve cartridge seals. The flanged double balanced cartridge seals allows bench pressure testing while the rugged housing has been designed to take the high thrust pressures some seals can generate. Mixtec seal housing designs are versatile and strong, therefore ensuring minimum deflection and long seal life.



ENGINEERING



Drive housings are engineered to withstand the static and dynamic loads generated during the operation of the mixer. Gearing is precision manufactured for longer life and greater load carrying capacity.

Large output shafts ensure trouble free operation of the long-overhung shaft and agitator impeller system. Superior sealing using a quadralip seal arrangement is a standard on Series 1000 units

QUALITY CONTROL

Mixtec aims to conduct all our business activities in a sensible and professional manner, whilst seeking continuous improvement and ensuring compliance to all legal and other requirements.

Mixtec’s units are manufactured under the strictest conditions and to the highest standards to suit their intended operating environments, from hot, dusty, arid deserts to backfill units operating in humid conditions thousands of meters underground.

Mixtec’s components undergo various testing such as non destructive testing, magnetic particle, ultrasonic and x-rays, according to client requirements. Mixtec has commissioning engineers that are permanently available to oversee all installations of new equipment on site to ensure correct procedure is followed.



“The Perfect
Blend of Experience
and Drive.”



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