



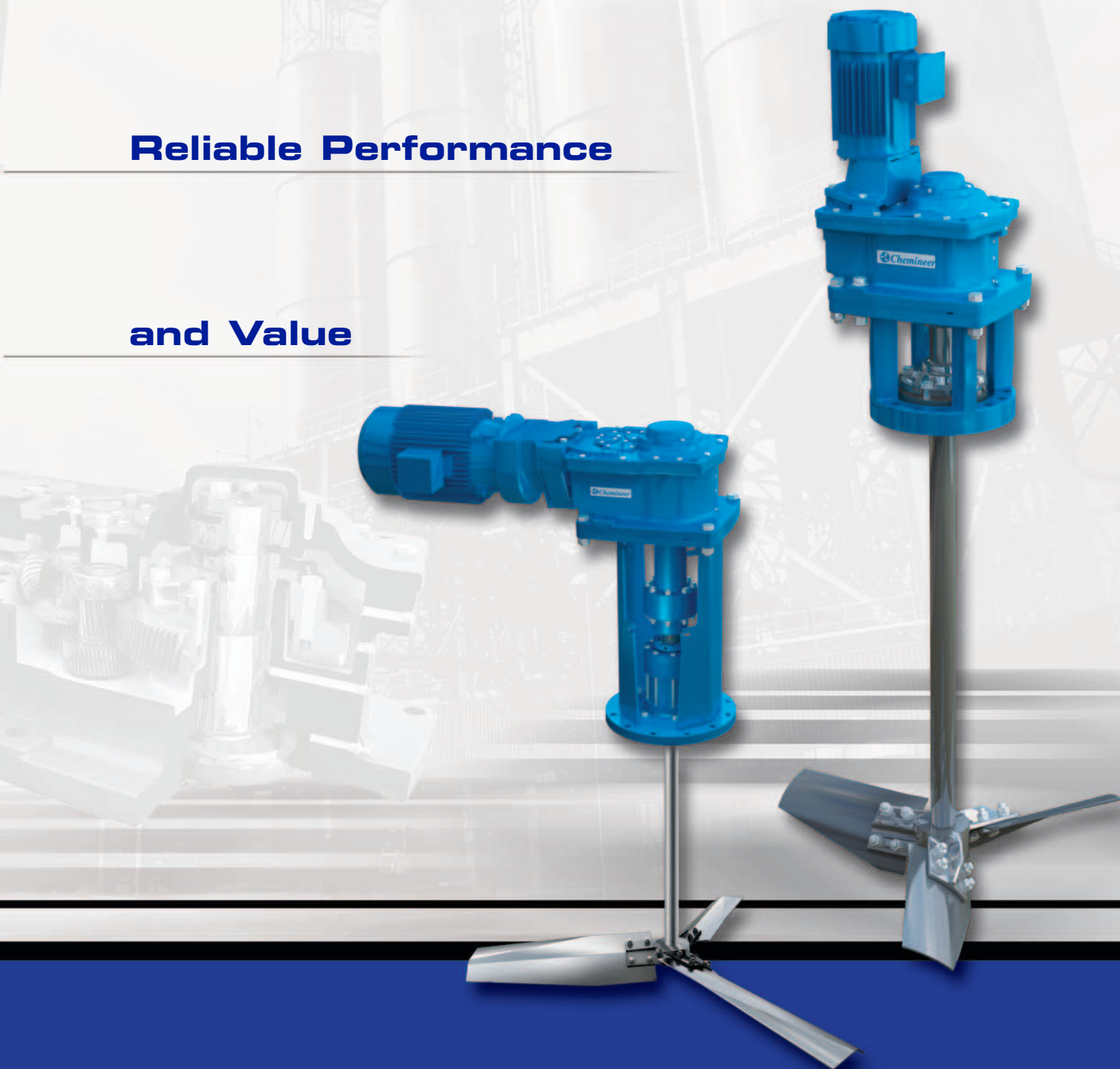
**ENTORNO
INDUSTRIAL**

 ***Chemineer***

Model 20 HT and GT Agitators

Reliable Performance

and Value



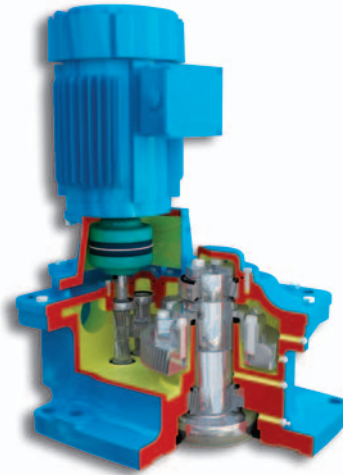
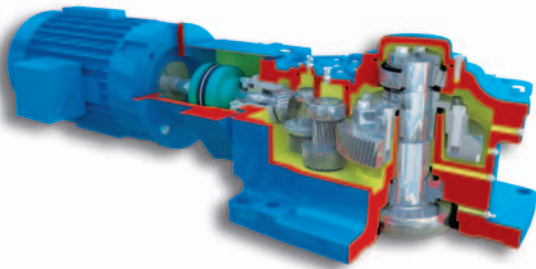
Premium Performance

The Model 20 HT and GT units feature a gearbox designed specifically for agitator service. Available in right angle (HT) and parallel shaft (GT) configurations, this rugged performer can be tailored to meet virtually any process, from critical chemical reactor systems to storage applications.

Combining the benefits of the HT and GT time proven agitators into a modular design package, Chemineer provides solutions to optimize your mixing applica-

tions today and flexibility to handle your changing requirements in the future.

The Model 20 HT/GT is designed to meet AGMA, OSHA, ANSI, IEC, DIN, EU and ATEX standards and requirements.



How is the Chemineer Model 20 HT/GT Gearbox Superior?

Output Shaft Requirements

Commercial gearboxes usually have smaller output shafts that are poorly suited for agitator duties, leading to higher gear deflections, more noise and lower reliability. For optimum mechanical integrity, it is beneficial to design the low speed shaft so that the shaft diameter between the bearings is large and the distance between the bearings is small. Commercial gearboxes tend to use smaller shaft diameters, resulting in the need to select larger and more expensive units to handle the bending moments associated with overhung loads.

AGMA Ratings when Applied to Agitators

AGMA established a general purpose standard intended to be applied to gearboxes used in a wide range of industrial applications. Agitators have particular duties that make reliance on AGMA service factors inappropriate. A standard commercial gearbox tends to use smaller shafts and larger bearing spans that result in higher deflection, wear and shorter lifespan. To obtain adequate drive life a high service factor must be applied.

The Chemineer Solution

The Chemineer Model 20 HT/GT gearbox is unique and superior because it is designed specifically for agitator duties. In comparison with a general purpose gear-drive of the same nominal AGMA torque rating, it has much longer bearing and gear lives, which

translate to lower maintenance costs and greater productivity. It also has an oversized output shaft, which reduces gear deflection and noise, with a true dry well seal to avoid the risk of leaking lubricant down the shaft.

Drive Features and Benefits

Internal Shafting

Features

- Oversized low speed shaft diameter and short bearing span

- Recessed low speed coupling half

Benefits

- Time proven design to handle shaft/impeller bending loads, reducing deflection and gear misalignment, thereby extending bearing and gear life

- Simplifies installation with no requirement to install the extension shaft up through the gearbox

Gearing

Features

- Double and triple reduction options

- Helical/spiral bevel (HT) and all helical (GT)

- Case carburized gearing

- Reverse rotation capability

Benefits

- Double/triple reduction decreases gear loads, lowers noise levels and allows for non-synthetic lubrication over competitive single reduction designs

- Most efficient gearing available; reduces energy costs

- Reduces wear rate for 20+ year service life

- Available option for process flexibility

Housing and Lubrication

Features

- Cast gearbox housing

- Dry well seal

- Bath lubrication

- Standard R&O oils and grease

- Extra seal over dry well

Benefits

- Modular design with right angle (HT) and parallel shaft (GT) configurations

- Reduces noise level

- Eliminates lubrication leaks which are common in commercial gearboxes with no dry well

- Ensures vital lubrication to gears and bearings at all operating speeds, eliminating internal/external lubrication pumps

- No synthetic lubrication is required, saving installation and maintenance costs

- Keeps oil out of dry well while moving gearbox

Bearing Design

Features

- Tapered roller output bearings with short bearing span, grease lubricated

- Tapered roller/cylindrical roller bearings, oil lubricated

Benefits

- High capacity to handle bending and thrust loads while providing long life

- Ensures cool operation, long life and low maintenance

Seal Features and Benefits

Features

- Drop collar shaft support during seal change
- Optional throttle bushing and debris well design
- Swing out or spacer spool seal change designs
- Variety of seal options from major mechanical seal vendors such as John Crane, Flowserve, Chesterton and AES
- Seal designs include cartridge single and double seals and split seals
- Low height pedestal (swing out) and seal bearing (spacer spool) design options
- Optional seal shut-off device
- Jacks-n-Rails assembly available for large diameter seals
- Optional lip seals and stuffing boxes

Benefits

- Shaft drops easily by loosening coupling bolts, and engages by tightening the coupling bolts
- Shaft only drops 1/2" eliminating steady bearing disengagement
- Clean fluid flush eliminates process build-up in seal area improving seal life
- Eliminates particle shedding from entering tank
- No need to pull shaft up through gearbox or in-tank shaft supports
- No labor or parts required for special shaft support system
- No lifting and removing of gearbox, saving labor and downtime
- Cartridge double and single seals, low pressure single seals, and cartridge ChemSeals provide performance and flexibility to meet agitator sealing needs
- Reduces seal change out time and shaft wear as compared to non-cartridge (shaft mounted) designs
- Seal located close to shaft support bearings (swing out) and integral seal bearing (spacer spool) reduces shaft deflections at seal, improving life
- Eliminates operator exposure to hazardous vapors without draining the vessel
- Reduces labor time for seal change-out with no extra hoists required
- Low cost lip seals available for low pressure applications
- Self-lubricating packing offers low maintenance sealing options for pressures up to 100 ps



Swing Out Seal Change

Sealing and Mounting Options

Open Tank

• Drive Mounted to Beams

Using a heavy-duty, cast housing capable of handling maximum loads, the agitator mounts readily to support beams or similar structures for common open tank applications. Auxiliary seals are an option.

• Pedestal-Mounted to Beams

The rugged, cast iron pedestal of the agitator raises the gear drive 10 to 14 inches away from the support structure to prevent exposure of the drive to the fluid and to facilitate service.

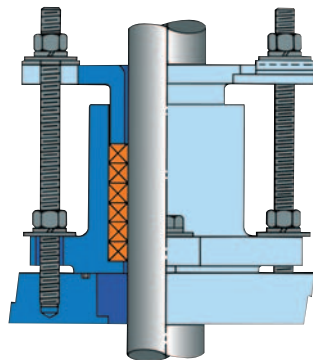
Closed Tank – Seal Options

• Lip Seal

The spring-loaded, nitrile rubber lip seal protects process fluid from contamination in lower pressure applications.

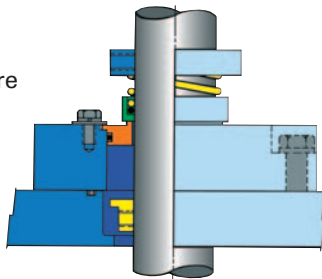
• Stuffing Box

The six-ring stuffing box utilizes standard PTFE/graphite-braided packing requiring no lubrication. Optional packing materials are available.



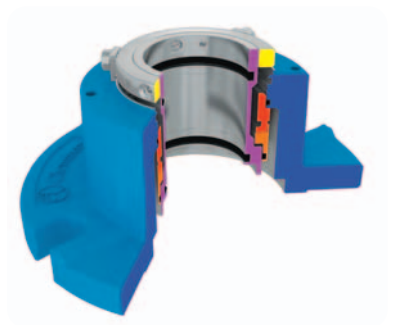
• Single Mechanical Seal

The single dry-running mechanical seal is the economical choice where a pressurized barrier between the tank contents and the outside environment is not necessary.



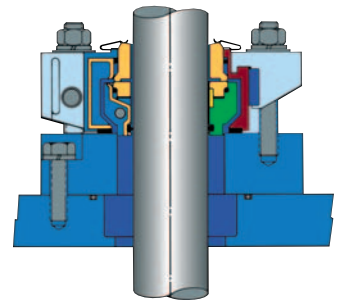
• Single Mechanical Cartridge ChemSeal

The single mechanical seal offers dry-running capability with an easily replaceable cartridge.



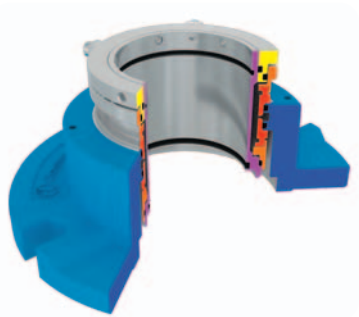
• Split Mechanical Seal

The two-piece design simplifies installation and maintenance.



• Double Mechanical Cartridge ChemSeal

Double mechanical cartridge seals offer excellent sealing capabilities, long life and minimum maintenance. An appropriate barrier fluid keeps tank contents from escaping.



Shaft Design

Both process and mechanical considerations determine shaft design. Shafts are sized to resist torsional loads and bending moments induced by hydraulic forces acting on the impeller, as well as to avoid excessive vibration due to the coincidence of critical frequencies and operating speed.

Shafting is straightened to tight tolerances for long seal life and smooth operation – less than 0.003 inches total run out per foot of shaft length (0.25 mm per meter).

Custom couplings, impellers, shafts and steady bearings are available upon request, including sanitary designs.

Types

Shafting is supplied in a single piece design or in rigidly coupled sections for easy installation. For large diameter shafts, pipe shafting is a viable option with couplings and impeller hubs welded to the shafting. A wide range of materials and coating options are available.

Couplings

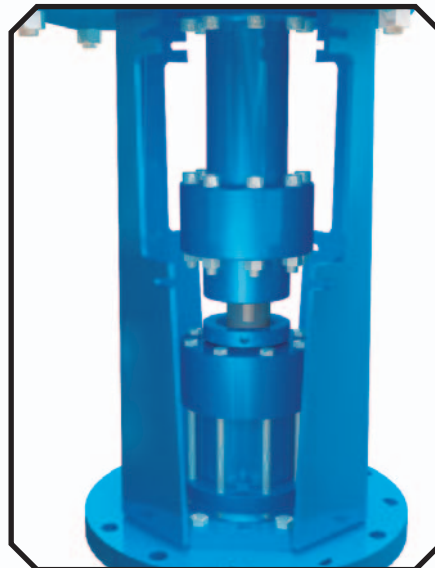
To facilitate assembly in the field, extension shafts are attached to the drive shaft with flanged rigid couplings, eliminating the need for shafts to be installed through the gearbox. Optional in-tank couplings can either be removable tapered bore or welded simplifying installation of long shafts.

Steady Bearings

Steady bearings are available to help support extremely long shafts. Tripod, bracket and pad-type steady bearings are standard design options.

Extended Keyways

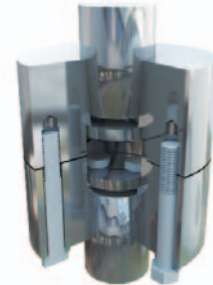
Extended keyways for adjusting impeller location offer process and design flexibility.



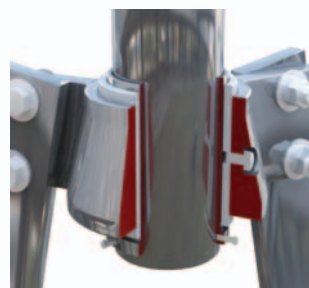
Standard Spacer-Spool Style Pedestal and Seal Arrangement



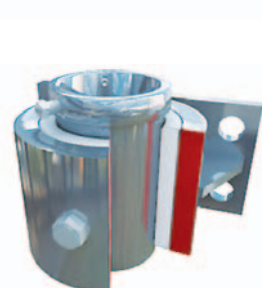
Welded Coupling



Removable Coupling



Tripod Steady Bearing



Bracket Steady Bearing

Impeller Technology

Chemineer's impeller technology is effectively applied across your spectrum of applications ensuring successful, repeatable results from lab scale to full scale operations.

Chemineer's mixing expertise includes high flow, low shear liquid-liquid agitation, solids suspension, gas

dispersion, high shear blending and viscous mixing. Whether it is R&D or production phase, we have the expertise to solve your mixing challenges.

Impeller bulletin 710 is available with additional information.



SC-3



HE-3



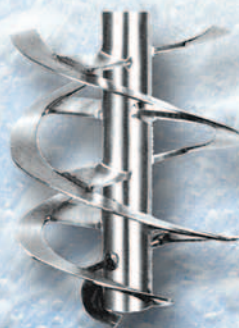
XE-3



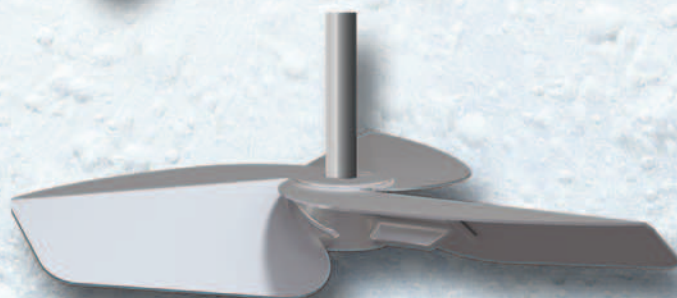
Maxflo W



BT-6 Gas Dispersion



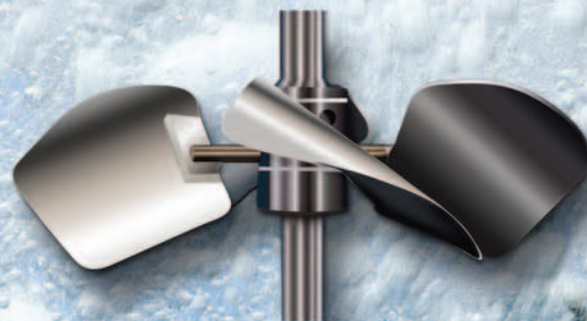
Helix



RL-3

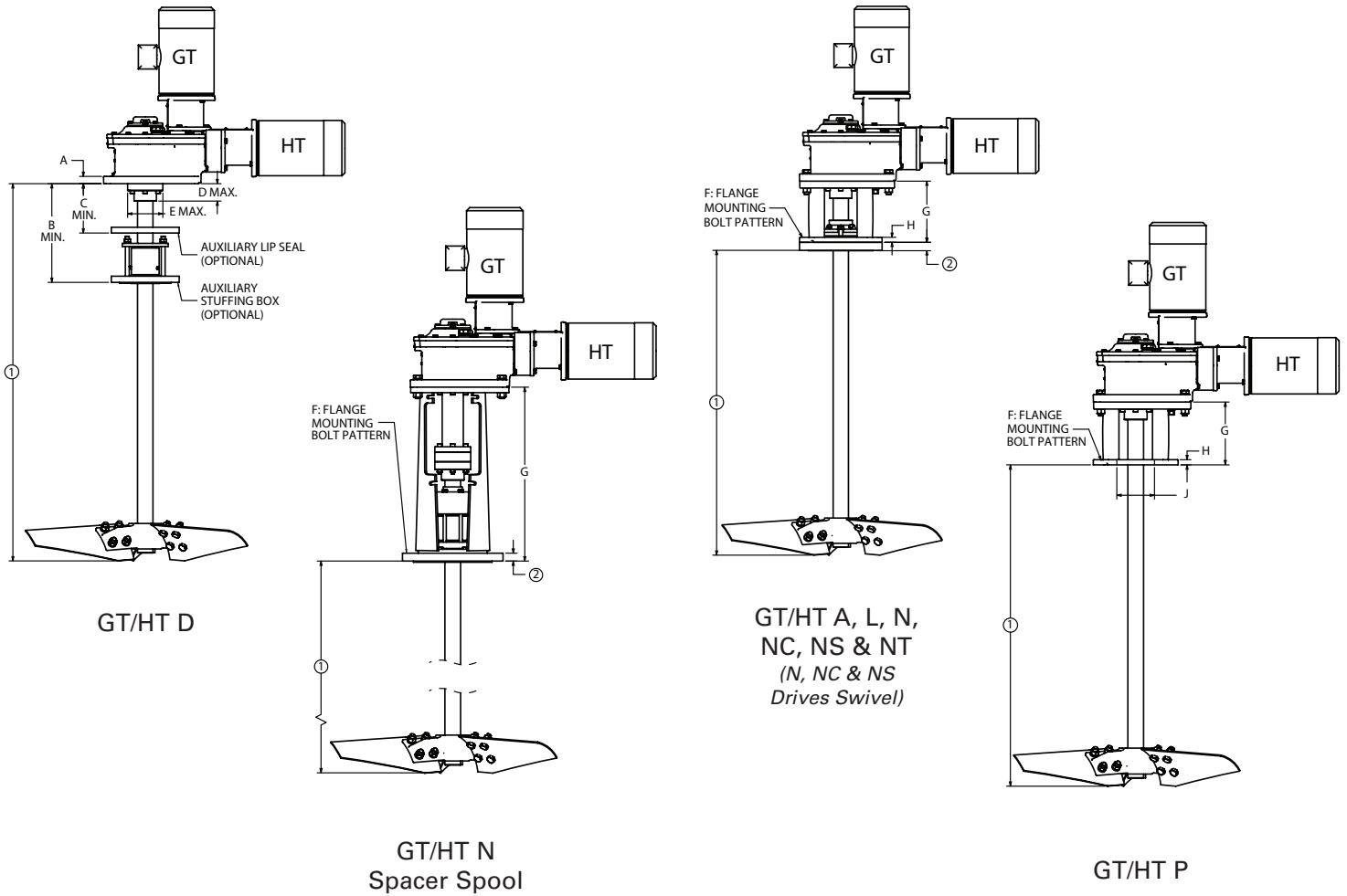


P4 - Pitched Blade Turbine



Smoothline Maxflo W

Dimensions



Agitator Dimensions

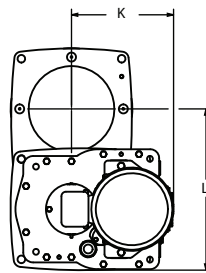
CASE SIZE	A	B	C	D	E	F	G		H	J
						Bolt Pattern	Spacer	Swivel		
21GT	1.18	13.94	6.94	2.94	5.71	8" - 150# ANSI (Holes Straddle C.L.)	26.19	10.00	0.75	9.50
22GT	1.38	18.00	8.00	4.00	7.48	10" - 150# ANSI (Holes On Center Line)	29.82	12.50	0.88	10.00
23GT	1.58	18.63	8.63	4.63	9.45	12" - 150# ANSI (Holes Straddle C.L.)	33.94	14.06	1.18	10.83
21HT	1.18	13.94	6.94	2.94	5.71	8" - 150# ANSI (Holes Straddle C.L.)	26.19	10.00	0.75	9.50
22HT	1.38	18.00	8.00	4.00	7.48	10" - 150# ANSI (Holes On Center Line)	29.82	12.50	0.88	10.00
23HT	1.58	18.63	8.63	4.63	9.45	12" - 150# ANSI (Holes Straddle C.L.)	33.94	14.06	1.18	10.83

1. Agitator output speed, shaft diameter and extension, impeller design and other optional features to suit application
2. Alternate flange sizes are available

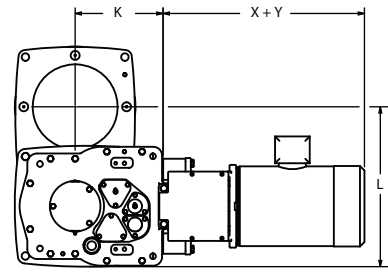
Dimensions

Swivel Dimensions

CASE SIZE	K	L
21GT	11.18	17.57
22GT	17.50	22.61
23GT	21.90	28.31
21HT	9.84	17.57
22HT	12.56	22.61
23HT	16.61	28.31



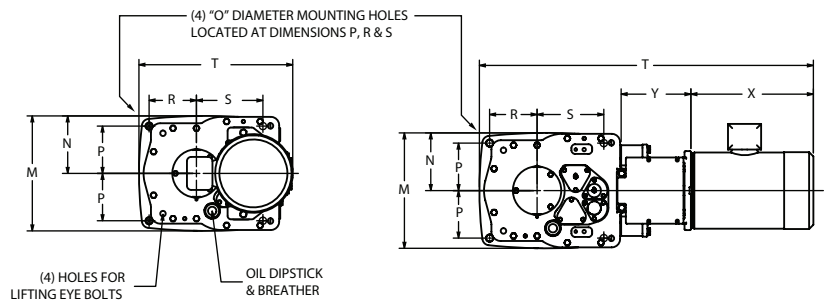
GT



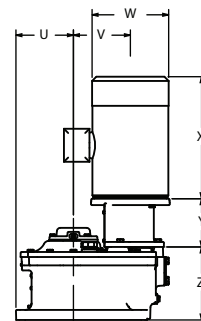
HT

Typical Drive Assembly Swivel Dimensions

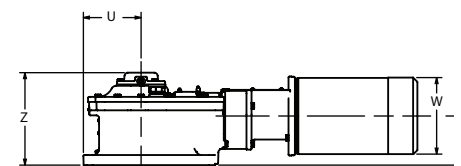
(Drive assembly pivots at top of pedestal to allow change-out of mechanical seals. See I.O.M. for special motor conduit instructions)



Motor Dimensions									
FRAME SIZE	W	X	Y						
			21GT	22GT	23GT	21HT	22HT	23HT	
NEMA	140	7.75	13.11	3.98	—	—	6.46	—	—
	180	9.25	16.24	5.51	6.02	—	7.99	9.41	—
	210	11.00	17.96	5.51	6.02	—	7.99	9.41	—
	250	12.75	22.25	—	6.85	7.01	—	10.24	11.43
	280	14.50	24.24	—	7.76	7.01	—	11.14	11.43
	320	16.88	27.00	—	8.23	8.27	—	11.61	12.69
	360	18.50	27.63	—	—	9.49	—	—	13.91
	400	20.88	31.75	—	—	10.83	—	—	15.25
IEC	80	6.61	10.66	3.58	—	—	6.06	—	—
	90	7.40	11.18	4.13	—	—	6.62	—	—
	100	7.72	13.15	4.92	5.35	—	7.40	8.74	—
	112	9.45	13.03	4.92	5.35	—	7.40	8.74	—
	132	10.16	16.73	5.39	6.22	6.10	7.88	9.61	10.52
	160	12.52	21.26	—	7.87	7.48	—	11.26	11.90
	180	14.37	23.31	—	7.87	7.48	—	11.26	11.90
	225	17.64	30.51	—	—	9.53	—	—	13.95
250	20.00	35.04	—	—	9.53	—	—	13.95	
280	22.17	38.39	—	—	9.53	—	—	13.95	



GT

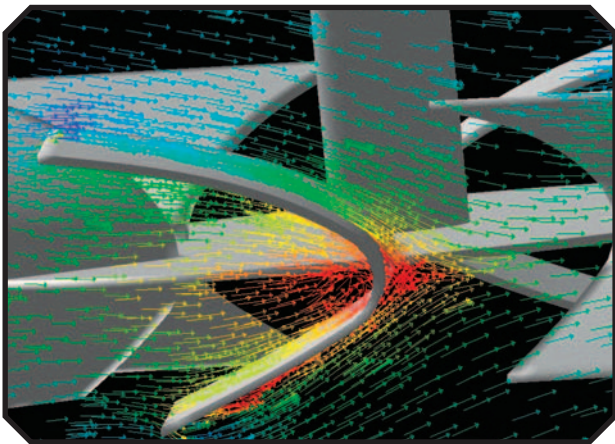


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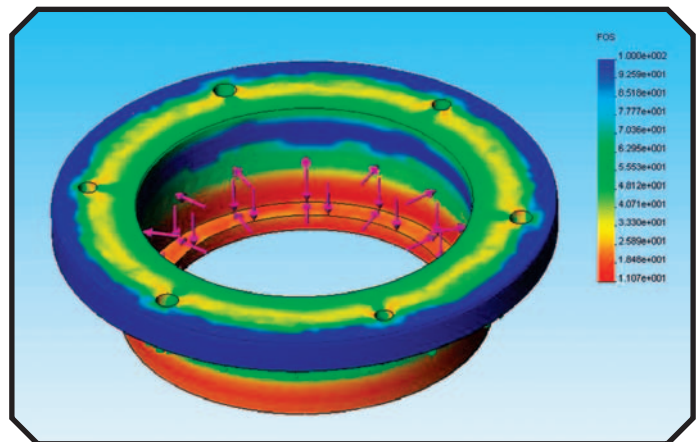
Drive Assembly Dimensions										
CASE SIZE	M	N	O	P	R	S	T	U	V	Z
21GT	12.77	6.45	0.84	5.56	5.56	7.81	17.91	6.73	6.69	8.47
22GT	16.97	8.48	1.00	7.06	7.06	10.06	26.00	8.50	9.06	10.75
23GT	21.97	10.99	1.00	9.65	7.68	2.17	31.15	9.25	11.41	14.80
21HT	12.77	6.45	0.84	5.56	5.56	7.81	38.75	6.73	5.75	10.83
22HT	16.97	8.48	1.00	7.06	7.06	10.06	59.70	8.50	7.23	12.91
23HT	21.97	10.99	1.00	9.65	7.68	2.17	73.47	9.25	9.77	16.50

The Chemineer Advanced Design Initiative brings proven technical expertise to each mixing solution, from basic mixer and impeller design through complex process application analysis. Continuing research in both mechanical and process aspects of mixing allows Chemineer to provide high quality and high value products and services. Combined with proprietary data evaluation methodology and extensive field experience, Chemineer provides the most accurate application evaluation possible. Let Chemineer optimize your application, saving you time and money, by applying our experience and state-of-the-art tools, such as:

- Chemineer's high-tech customer test lab—offers the most advanced testing techniques in the industry
- Chemineer's R&D lab provides advanced process and mechanical research which is incorporated into custom design packages to optimize your application
- Computational Fluid Dynamics (CFD)—provides visual projections of mixer performance by generating a series of mathematical models of fluid flows (see Bulletin 750)
- Digital Particle Image Velocimetry (DPIV)—provides instantaneous flow visualization and quantitative measurement of the fluid velocity field (see Bulletin 755)
- Laser Doppler Anemometry (LDA)—corroborates time averaged DPIV data, especially for velocity fields in the vicinity of the impeller
- Laser Induced Fluorescence (LIF)—enables the user to gain a fundamental understanding of mixing by tracking the path and diffusion of injectants in agitated vessels and static mixers
- CEDS[®] (Chemineer Expert Design System)—the industry leader in agitator design and analysis software. This proprietary program suite optimizes process performance, in addition to mechanical integrity, strength and reliability
- ChemScale[®]—the industry standard method for effective mixer selection that helps to optimize the agitator design for your specific process needs
- Finite Element Analysis (FEA)—dynamic vibrational and stress analysis of vessel and agitator support structures ensures proper design to handle agitator loads. Product design tool for stress and deformation analysis ensures product safety and reliability
- CAD 3-D Design—state of the art product and job design software, with customer specific mixer drawings available
- A library of Chemineer technical articles—available on the web site at www.chemineer.com



Example of CFD Modeled Flow Fields



Example of FEA Analysis

Chemineer Express' mission is to offer customers immediate assistance to help achieve operating performance goals for agitation and mixing processes. This is accomplished in two ways: ensuring replacement parts and services are available on a timely basis to increase the "uptime" of your systems, and ensuring customers are offered the latest technology to improve the performance of agitation and mixing systems.

The Right Part Every Time

Chemineer Express provides drop-in replacement parts of standard and custom Chemineer agitator components, minimizing installation problems like improper fit-up or alignment. Chemineer replacement parts are made to original equipment specifications to ensure maximum reliability of your mixing equipment.

Technical Support

Chemineer Express technical support is just a phone call away. Whether you need assistance with installation, startup, maintenance, or replacement parts, our technical experts are ready to help.

Field Service is ready to assist your crew with installation, troubleshooting, reliability audits, or maintenance and operator training in your facility.

Installation

Chemineer offers expert help on installation, whether your application requires one or multiple agitators. Our sales and field service engineers can quickly and efficiently supervise the installation and start-up of your agitator.



Chemineer Express Service Center

Chemineer Express offers multiple options to get your process back up and running. Highly-Trained Field Service Engineers are ready to deploy for assisting maintenance crews in repair, diagnostic, and/or maintenance work. A Chemineer Authorized Service Center is located near your plant for quick responsiveness backed by the full support of the Chemineer manufacturing facility.

The Chemineer Express Service Center is located in the Chemineer manufacturing facility for more extensive failure analysis, fast replacement parts assemblies, and the most reliable agitator repair service in the world. New and refurbished parts options are available to suit your business requirements and get equipment back into operation.

Chemineer Express offers Customer Service Plans tailored to fit your needs. Contact your local representative or Chemineer Express (937-454-3200 or chemineerexpress@nov.com).

Parts

Our large inventory supports your stock and provides quick fulfillment of maintenance and repair needs. Emergency parts are shipped from our stock within 24 hours. In addition to a wide selection of standard replacement items such as bearings, seals and motors, we stock complete drives and internal subassemblies. Our drive exchange program offers a replacement drive for rapid conversion for Chemineer and competitive drives.

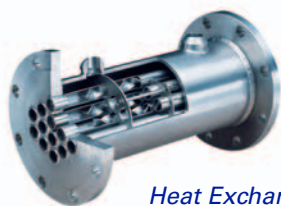
Warranty

For added peace of mind the Model 20 HT/GT agitator is backed by a comprehensive product warranty.

Other Quality Products from Chemineer



KMX-V Static Mixer



Heat Exchanger



Homogenizer



Colloid Mill



PB Agitator



Pipeline Mixer



KM Static Mixer



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