**Mixing Technologies Side Entering Agitators** Reliable Performance and Dependability



# The Proof is in the Performance

#### Innovative Solutions to Satisfy Your Needs

We have the capabilities, knowledge and experience to effectively evaluate application requirements and apply and/ or customize our high quality mixing equipment to provide innovative mixing solutions that:

- Perform consistently
- Minimize maintenance costs and downtime
- Provide long service life
- Optimize total cost of ownership

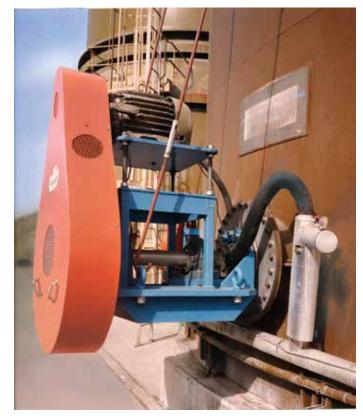
We market our side entering agitators under the Chemineer™ and Prochem™ brand names. Side entering agitators as compared to top entering agitators typically:

- Utilize higher HP at faster rotational speeds
- Mount easily to the side of vessel with a simple pipe leg support on tie rods
- Have shorter shaft lengths and weigh less

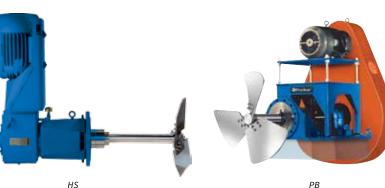
#### The Mixing Technologies Difference

The extensive line of Chemineer and Prochem side entering agitators offers numerous benefits to the customer not often found in competitive equipment including:

- Application versatility proprietary ChemScale™ method for effective agitator selection with both gear or belt driven configurations
- Proven performance and extended service life—heavy duty bearings and shafts
- Optimal mixing efficiency high performance impeller options
- Ease of maintenance—tank shut off devices and multiple sealing options



Prochem side entering agitators satisfy critical mixing applications worldwide



#### Drive Choices for Application Versatility

We manufacture and market both gear driven and belt driven, side entering agitators with over 60 years of field proven performance. Designed for demanding applications in Pulp and Paper, Flue Gas Desulphurization (FGD), Biofuel, Petroleum Blending and Storage, BS&W and CPI vessels to name but a few, these agitators provide rugged dependability, application versatility and easy, economical maintenance. We offer three side entering agitator designs to meet the specific requirements of your applications. The HS agitators feature a spiral bevel gear driven design for demanding applications that include significant fluctuations in load. The PB agitators feature a belt driven design that incorporates



MD

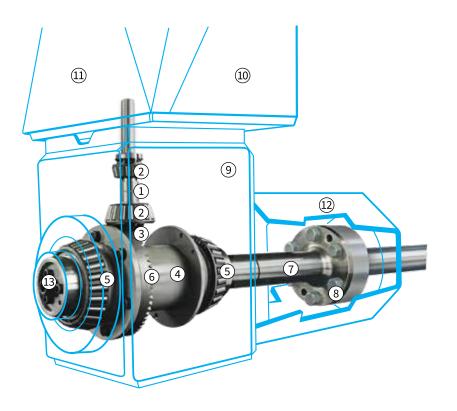
a pillow block bearing configuration for economical performance and easy maintenance. The MD agitators also feature a belt driven design, but incorporate an innovative bearing cartridge configuration that protects the bearings from the process fluids.

### Chemineer Gear Driven Agitator Advantages

The HS gear driven, side entering agitators offer ruggedness and dependability in an extensive range of applications. Designed for maximum service life, the HS agitators use precision machined, surface hardened spiral bevel gear sets, high capacity tapered roller bearings and heavy duty output shafts.

### Features and Benefits

	Features	Benefits
Design Parameters	<ul> <li>Four standard sizes ranging from 1 to 75 HP</li> <li>Custom designs available for higher HP applications</li> </ul>	• Extensive power options to satisfy a variety of applications
besign randineters	• Two standard output speeds - 350 and 230 rpm for 60 Hz designs - 290 and 190 rpm for 50 Hz designs	<ul> <li>Application versatility to meet specific requirements</li> </ul>
	• Hardened spiral bevel gearing	<ul> <li>Higher power transfer efficiency than other types of gearing for heavy duty performance</li> <li>Generates less heat for long service life</li> </ul>
Gearing and Bearings	• All gears load rated per AGMA standards and inspected to AGMA Quality 10 levels	• High quality ensures performance to meet all demands
	• High capacity, tapered roller bearings used throughout	<ul> <li>Exceptional wear resistance and long service life</li> <li>Rated at a minimum of 30,000 hour L-10 bearing life</li> <li>All bearings mounted on carriers for easy maintenance</li> </ul>

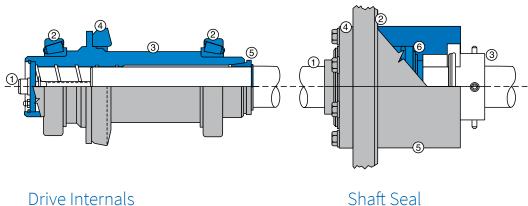


#### Gearbox Components

- 1 Spiral bevel pinion shaft
- 2 High speed shaft bearings
- **3** Spiral bevel pinion
- 4 Hollow shaft
- 5 Low speed shaft bearings
- 6 Spiral bevel gear
- 7 Drive shaft
- 8 Extension shaft coupling (with mechanical seal only)
- 9 Housing
- 10 Motor bracket
- $\textbf{12} \ \text{Coupling guard}$
- 13 Pedestal
- 14 Retract mechanism

#### Features and Benefits

	Features	Benefits				
	• Large low speed shaft	Resists deflection and prevents gear misalignment				
	• Rugged, high quality extension shaft	<ul> <li>Minimizes deflection for excellent sealing and extended seal life</li> </ul>				
Shafts and Seals	• Output shafts available in carbon steel, 304 stainless steel, 316 stainless steel and other alloys	• Application versatility to meet a wide range of applications				
	<ul> <li>Packed stuffing box and single, split or double mechanical seals and slurry seal are available</li> </ul>	<ul> <li>Shaft sealing options provide versatility to cost effectively meet customer preferences</li> </ul>				
	• Easy seal change out	Improves uptime of your process				
	<ul> <li>Drive housing, motor bracket and pedestals are all fabricated from steel plate, machine welded and precision machined</li> </ul>	<ul> <li>Reduces noise level</li> <li>Rugged protection of gearing for long service life</li> <li>Accurate bearing alignment</li> </ul>				
Housing and Lubrication	• Compact, right angle configuration	<ul> <li>Takes up less space</li> <li>Minimizes overhung load and reduces nozzle reinforcement requirements</li> </ul>				
	• Splash lubricated	• Ensures vital lubrication to gears and bearings at all operating speeds for long service life				
	• Double lip seals on drive shafting	Prevent oil loss or contaminant infiltration for long service life				
Tank Shut Off	• A standard tank shut off device contains vessel contents during routine maintenance	<ul> <li>No need to disassemble the agitator for routine maintenance to minimize downtime and cost</li> </ul>				



- 1 Retract bolt assembly
- 2 Bearings
- 3 Hollow drive shaft
- 4 Spiral bevel gear 5 Split tapered collar
- 6 Spiral bevel gear

- 1 Extension shaft
- 2 Mounting flange
- **3** Shut off collar
- 4 Cartridge seal
- 5 Housing (integral with mounting flange)
- 6 Throttle bushing



# Gear Driven Agitator Dimensions

#### Agitator Dimensions

Case Size	1	2	3	4	
В	11"	11"	14"	17.25"	
c	6.5"	6.5"	8.5"	10.5"	
D	25.5"	25.5"	32.125"	38.5"	
E	19.75"	19.75"	25"	28.75"	
F	8"	8"	12"	12"	
G	5.125"	5.125"	7.0625"	9.3125"	
н	10.25"	10.25"	14.125"	18.625"	
J	26"	26"	33"	38"	
v	2"	2"	3"	3.5"	

#### Motor Dimensions (for totally enclosed and explosion proof,

1750 rpm motors)

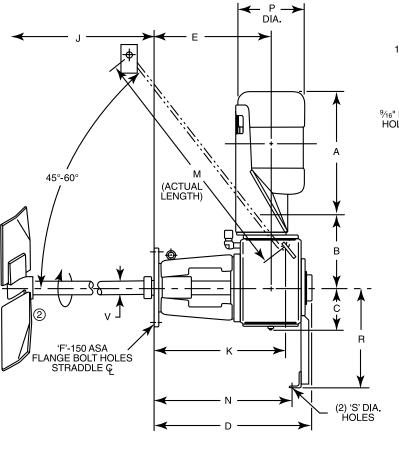
0	1		r	
1750 rpm	Frame A		P	
1	143T	12.25"	7.75"	
1.5, 2	145T	13"	1.15	
3	182T	14.375"	9.25"	
5	184T	15.375"	9.25	
7.5	213T	18"		
10	215T 29.5"		11"	
15	254T	22.875"	40.75"	
20	256T	24.625"	12.75"	
25	284T	26.625"		
30	286T	28.125"	14.5"	
40	324T	39.625"	40.075	
50	326T	T 31.125" 16.87		
60	364T	32.5"		
75	365T	33.5"	18.5"	
	rpm           1           1.5,2           3           5           7.5           10           15           20           25           30           40           50           60	1750 rpm         Frame           1         143T           1.5,2         145T           3         182T           5         184T           7.5         213T           10         215T           15         254T           20         256T           25         284T           30         324T           50         326T           60         364T	1750 rpm         Frame         A           1         143T         12.25"           1.5,2         143T         13"           3         182T         14.375"           5         184T         15.375"           7.5         213T         18"           10         215T         29.5"           15         254T         26.625"           20         266T         28.125"           30         284T         39.625"           50         324T         39.25"           60         364T         32.5"	

#### Mounting Dimensions

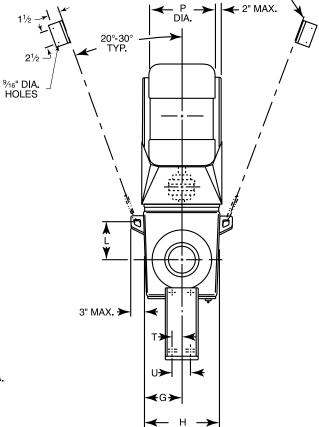
Case Size	1	2	3	4	
К	20.75"	20.75"	27.125"	31.625"	
L	6.25"	6.25"	7.75"	9.875"	
м	66"-72"	66"-72"	78"-84"	90"-96"	
Ν	21.375"	21.375"	27.6875"	33.5"	
R	27"	27"	34"	37"	
s	0.4375"	0.4375"	0.5625"	0.6875"	
т	2"	2"	2.25"	2.5"	
U	4"	4"	4.5"	5"	

① 230 rpm units use 1150 rpm motors;
 350 rpm units use 1750 rpm motors

② Impeller diameter and other options to suit application



НS



OPTIONAL ROD TIE SUPPORTS (EXACT POSITIONING OF THE ROD SHOES -DETERMINDED IN FIELD)

### Prochem Belt Driven Agitator Advantages

The PB and MD belt driven, side entering agitators provide easy to maintain configurations that minimize downtime and maintenance costs. Field proven performance for over 40 years makes Prochem agitators the ideal choice for a broad range of applications.

### Features and Benefits

	Features	Benefits		
	• Standard belt drive service factor is 1.3 with optional 1.5 and 2.0 available	Aligns with customers' equipment specification requirements		
Design Parameters	• Up to 300 HP as standard with designs up to 400 HP available (PB); up to 250 HP as standard with designs up to 500 HP available (MD)	• Extensive power options to satisfy a variety of applications		
	• Wetted parts available in many highly corrosion resistant materials including 316 stainless steel, 317L stainless steel, hastelloy C or titanium and other alloys available as needed	<ul> <li>Corrosive and abrasive environments can be easily handled</li> <li>Extends service life of wetted parts</li> <li>Can meet a wide range of application requirements</li> </ul>		
	• Pillow block bearing configuration (PB)	<ul> <li>No field alignment of bearings or packing needed due to prealignment on integral mounting base</li> <li>Easily accessible bearings access for economical maintenance</li> </ul>		
Bearings	• Enclosed bearing cartridge configuration (MD)	<ul> <li>Innovative design allows quick and easy replacement of bearings as a unit to reduce downtime</li> </ul>		
	• Minimum B-10 bearing life of 100,000 hours	Long bearing life for low cost of ownership		
	• Bearing shields and slingers are standard	• Protects bearings from the process fluid for long bearing life		



Pillow Block Assembly



Bearing Cartridge



### Features and Benefits

	Features	Benefits		
	• Shaft diameters up to 7 inches	• Wide range of shaft options increases application versatility		
Shafts and Seals	<ul> <li>Shafts designed to handle up to 10 times the normal operating load at full torque</li> </ul>	<ul> <li>Optimal performance and long service life in the most difficult applications</li> </ul>		
	<ul> <li>Packed stuffing box and single, split or double mechanical seals are available</li> </ul>	<ul> <li>Shaft sealing options provide versatility to cost effectively meet customer preferences</li> </ul>		
	• Chrome plated shaft sleeves are available	<ul> <li>Extends shaft life in highly corrosive or abrasive applications to minimize costs</li> </ul>		
	• Ultra VX belts and sheaves are used on both the PB and MD agitators	<ul> <li>Provides economical power transmission with shock absorbing capability for optimal performance and long life</li> </ul>		
	Made to OSHA standards	• Ensures operational safety of belt driven equipment		
Belt Drives and Guards	Ample ventilation regulates temperature	• Cooler running agitators extend service life for low total cost of ownership		
	• Guards on units with 3 inch or larger shafts contain access holes for adjusting belts	• Quick and easy maintenance reduces costs		
Housing and Mounts	<ul> <li>Designed to withstand severe loads many times that of typical application requirements</li> </ul>	• Quality construction extends service life		
Tank Shut Off	• Optional tank shut off device contains vessel contents during routine maintenance	<ul> <li>No need to disassemble the agitator for routine maintenance to minimize downtime and cost</li> </ul>		



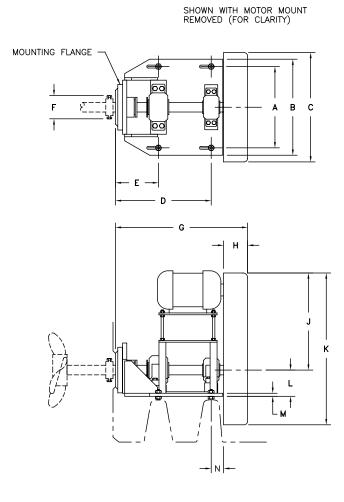
Tank Shut Off

# Belt Driven Agitator Dimensions

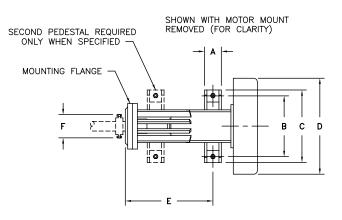
#### Agitator Dimensions

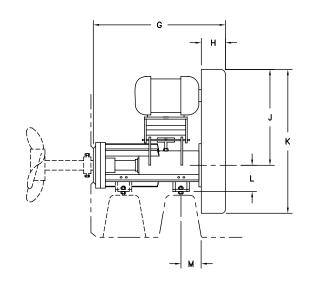
Model	A	В	c	D	F	F	G	н	J	к	L	м	N	Net Weight
20PB1S	20.5"	23.0"	23.0"	22.3"	8.6"	5.8"	34.3"	8.0"	20.3"	31.8"	4.9"	1.0"	3.8"	400
30PB1S	20.5"	29.0"	32.3"	25.2"	10.5"	6.8"	37.3"	8.0"	28.1"	44.3"	6.6"	1.3"	3.8"	890
40PB1S	30.0"	34.0"	43.8"	33.8"	12.8"	7.3"	48.8"	10.0"	41.9"	63.8"	8.5"	1.3"	4.8"	2000
50PB1S	39.0"	43.0"	56.3"	35.9"	15.4"	9.0"	55.9"	15.0"	50.1"	78.3"	10.3"	1.5"	4.8"	2530
60PB1S	43.0"	47.0"	56.3"	39.8"	15.7"	11.0"	59.8"	15.0"	50.1"	78.3"	13.3"	1.8"	4.8"	3240
20MD1S	4.0"	12.0"	15.0"	23.0"	20.1"	5.8"	32.1"	7.0"	20.3"	31.8"	5.0"	4.8"	-	350
25/30MD1S	5.0"	14.0"	18.0"	32.3"	23.4"	6.8"	34.3"	7.0"	28.1"	44.3"	7.0"	3.7"	-	770
35/40MD1S	6.0"	18.0"	22.0"	43.8"	28.1"	7.3"	45.6"	10.0"	41.9"	63.8"	8.6"	7.4"	-	1740
45/50MD1S	7.0"	24.0"	30.0"	56.3"	36.1"	9.0"	57.1"	15.0"	50.1"	78.3"	10.0"	5.8"	-	2200
55/60/65MD1S	10.3"	23.8"	28.8"	56.3"	34.0"	11.0"	57.5"	15.0"	50.1"	78.3"	11.0"	8.3"	-	2820

1 Net weight does not include motor, impeller or shafting beyond mounting surface, all weights are in pounds and are approximate



**PB** S configuration shown C & Z configurations available





**MD** S configuration shown C & Z configurations available

#### nov.com/mixing

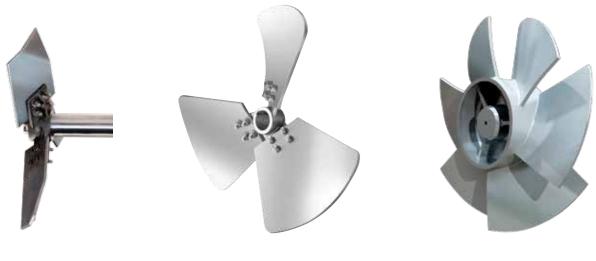
# Advanced Impeller Technology

The premier impeller for our side entering units is the WSE-3 which provides high pumping and low shear rates.

This proven performer offers:

- Reduced wear through lower tip speeds
- Hydrodynamic design for greater cavitation resistance than other impeller designs
- Easier maintenance with bolted blade construction
- High efficiency for maximum pumping action resulting from its hydrofoil design

In addition to the WSE-3 impeller, we also offer the Mark III or HE-3S upon request. Each impeller offers unique performance characteristics for specific application requirements.



HE-3S

WSE-3

Mark III

### Industry Leading Aftermarket and Technical Support

Features	Benefits
• Extensive network of factory trained field sales representatives and in house application engineers	• Experienced application specialists provide effective fluid mixing solutions
<ul> <li>Superior field technical support and an extensive inventory of replacement parts available</li> </ul>	<ul> <li>Installation, maintenance and troubleshooting support reduces downtime and costs</li> </ul>
• 24/7 hotline available	• Call +1-937-926-1724

#### **Sales Facilities**

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