

# TECHNICAL HANDBOOK

Heavy Duty Slurry Pump

# EMW<sup>®</sup>



# WILFLEY<sup>®</sup>



Wilfley Sealing  
Technology



No Flush Water  
Required

# WILFLEY SEALING TECHNOLOGY

Wilfley Sealing Technology is the premier sealing solution for the toughest pumping applications and has proven to be a superior alternative to conventional sealing systems like mechanical seals and compression packing. It has been the foundation for every Wilfley pump design, dating back to the ground-breaking Model A slurry pump in 1919.

## DYNAMIC & STATIC SEAL & SEAL

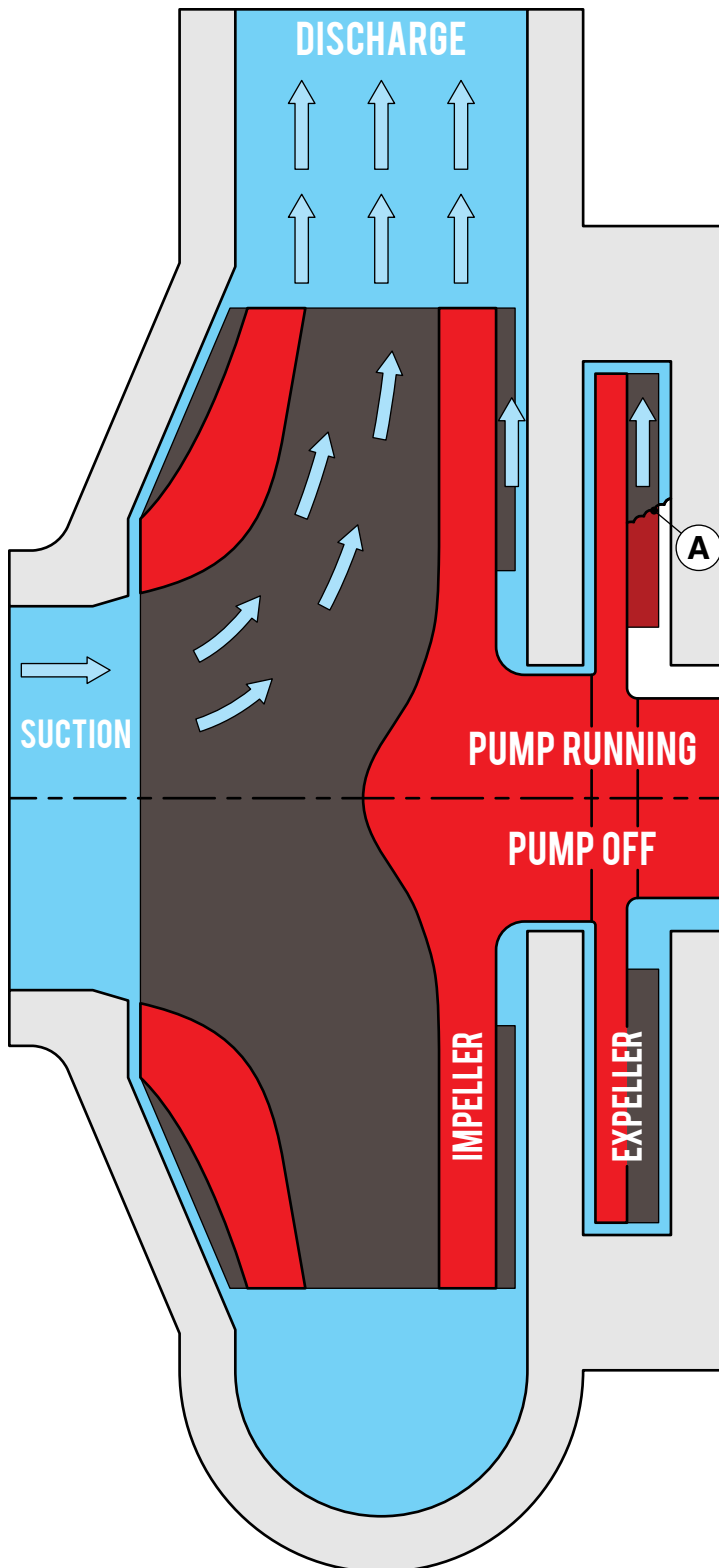
Wilfley Sealing Technology provides **leak free** operation at all times by partnering a dynamic seal (page 2) with a static seal (page 3). The dynamic seal prevents leakage while the pump is running and the static seal prevents leakage while the pump is off.

**The harmony between the dynamic and static seal is what makes Wilfley Sealing Technology excel beyond conventional seals.**



Wilfley Expellers

# WILFLEY DYNAMIC EXPELLER SEAL



## FEATURES & BENEFITS:

- A superior alternative to compression packing / mechanical seals and their associated flush systems
- Excellent solids / slurry handling capabilities
- Product dilution is eliminated
- Operational abuse tolerant, e.g. cavitation and vibration
- Reduces maintenance costs and maximizes production time through increased mean time between maintenance (MTBM)
- Exceptional dry running capability

## HOW THE WILFLEY DYNAMIC EXPELLER SEAL WORKS:

- The positively-driven expeller has specially designed vanes that act directly on the pump fluid
- A liquid partition **(A)** is established during pump operation by centrifugal forces generated by the expeller
- This liquid partition effectively isolates the pump fluid from the shaft
- The governor-actuated SolidLock® static seal manages all fluid containment during idle conditions

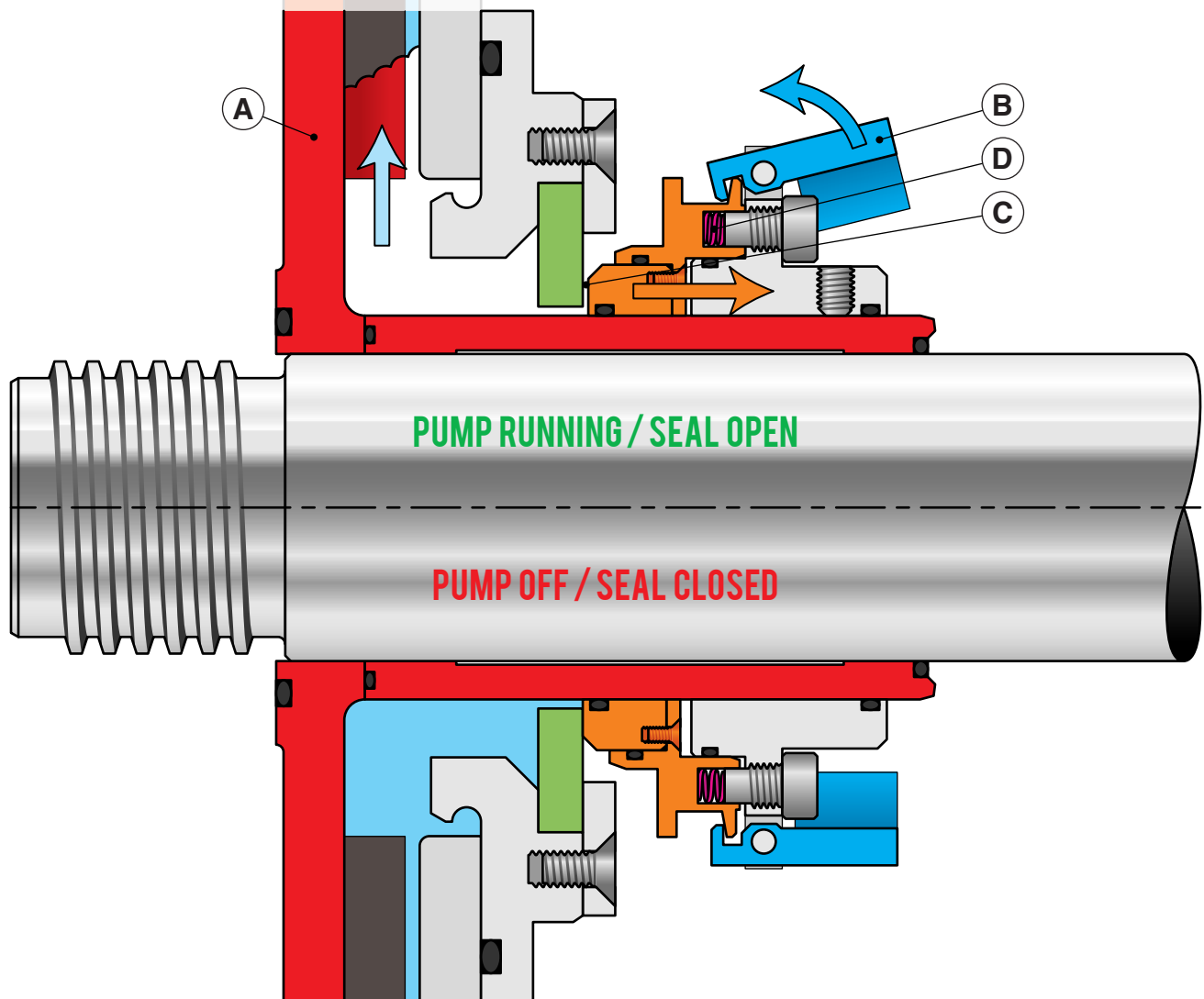
# WILFLEY SolidLock® STATIC SEAL



## HOW THE SolidLock® SEAL WORKS:

At start up, the expeller (A) generates hydraulic forces that evacuate the pump fluid away from the seal faces. As this happens, centrifugal force moves weights (B) outwards to open seal faces (C) and prevent any rubbing contact.

At shut down, the liquid partition dissipates and the pumped fluid is pushed towards the seal faces. Isolated springs (D) force the seal faces to close before any of the pump fluid can escape.



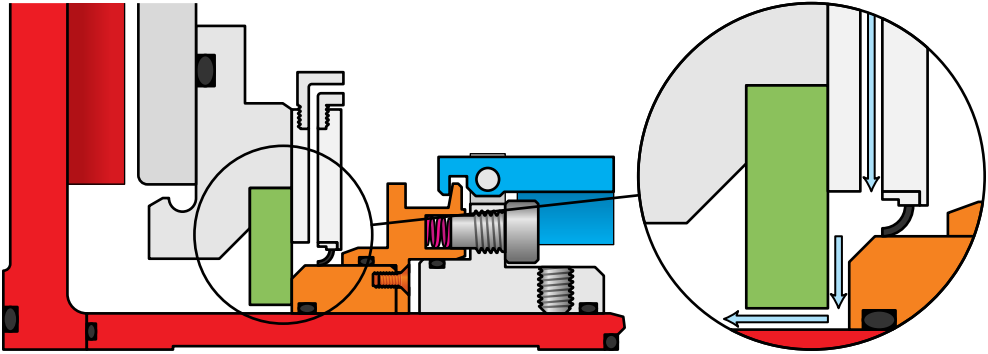
## FEATURES & BENEFITS:

- **Leak free operation** - Precise and controlled opening and closing of the seal faces
- **Reliable and repeatable seal actuation** - The spring force is specifically set for your application and can be easily adjusted in the field if necessary
- **Easy to install / maintain** - Simple and effective design, no special tools needed

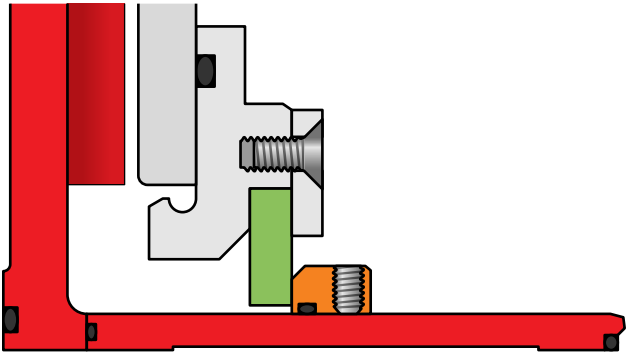


# EMW<sup>®</sup> SLURRY PUMP SEALING OPTIONS

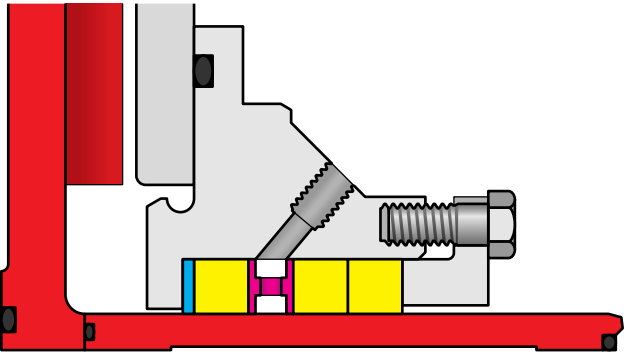
The EMW<sup>®</sup> pump has been designed to accommodate a wide variety of sealing options to specifically suit your application.



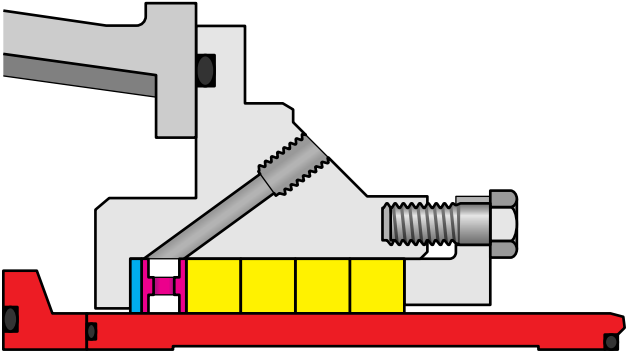
**SolidLock<sup>®</sup> with Purge Port**  
(Start Up and / or Shut Down Washout Capability)



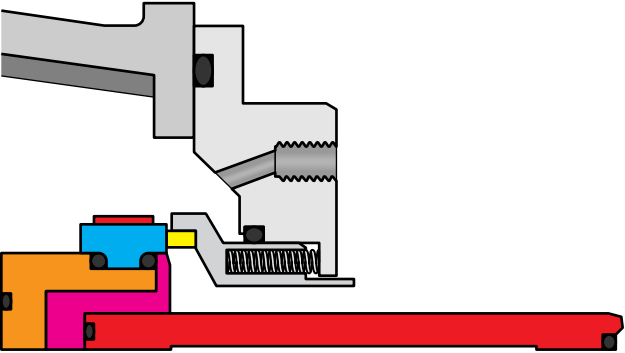
**SolidLock<sup>®</sup> Lite**  
(Diaphragm Seal with Expeller)



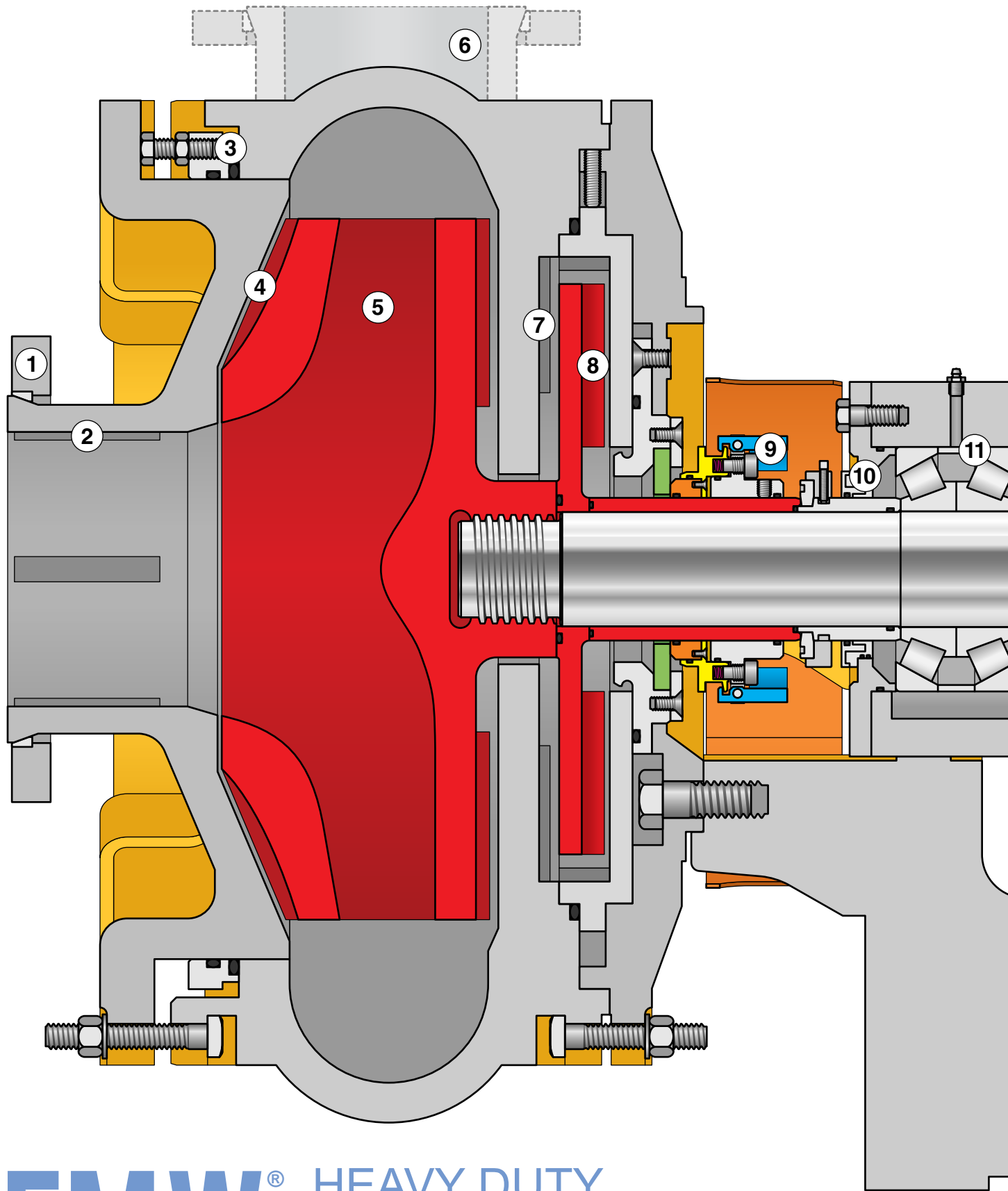
**Expeller with Compression Packing**  
(Weep Configuration Shown)



**Compression Packing**  
(Flush Configuration Shown)



**Single / Double Mechanical Seals**



**EMW**<sup>®</sup> HEAVY DUTY  
CLASS 3 & 4  
SLURRY PUMP

# EMW<sup>®</sup> SLURRY PUMP FEATURES & BENEFITS

## WET END

- 1 ASME/ANSI and ISO/DIN flanges available\*
- 2 Flow straightening vanes minimize turbulence, extend wear life, and improve performance
- 3 Adjustable suction cover to optimize efficiency and minimize wear (larger sizes only)\*
- 4 Front and rear impeller vanes reduce wear
- 5 Optimized hydraulics for high efficiency, low NPSHr, and low wear
- 6 Tangential discharge improves efficiency and reduces wear
- 7 Static vanes reduce wear

## WILFLEY SEALING TECHNOLOGY

- 8 Optimized expeller provides superior dynamic sealing with zero operational leakage
- 9 SolidLock<sup>®</sup> static seal engineered for reliable sealing

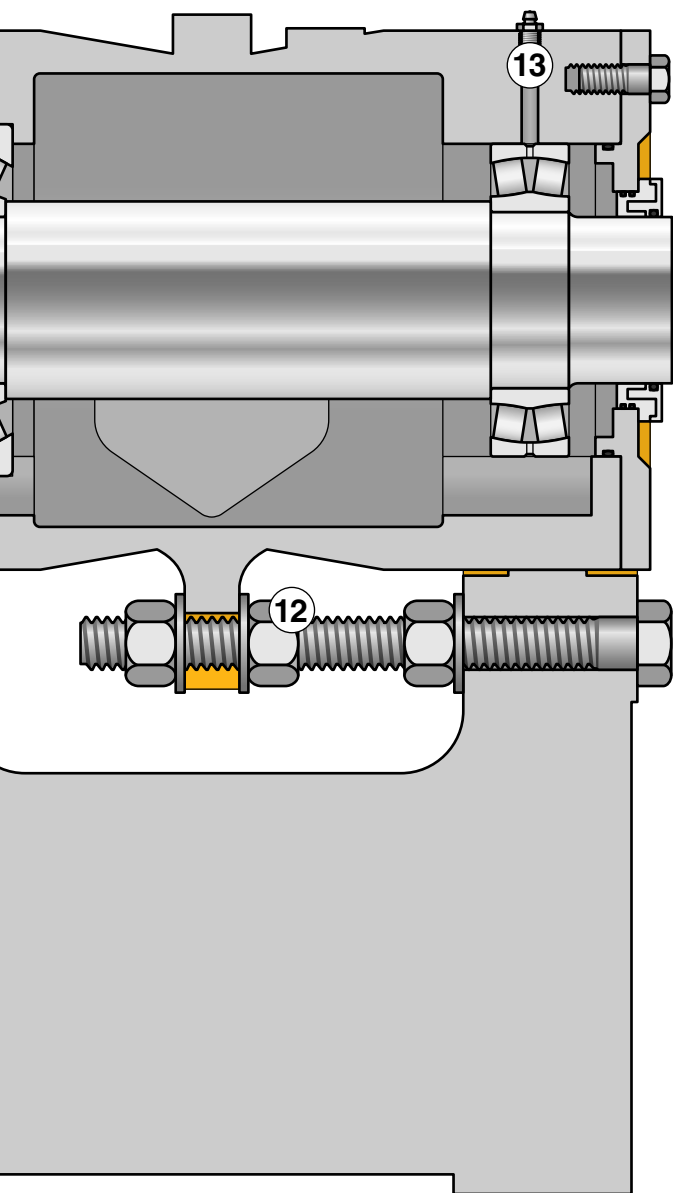
Other sealing options available including packing and mechanical seals

## POWER END

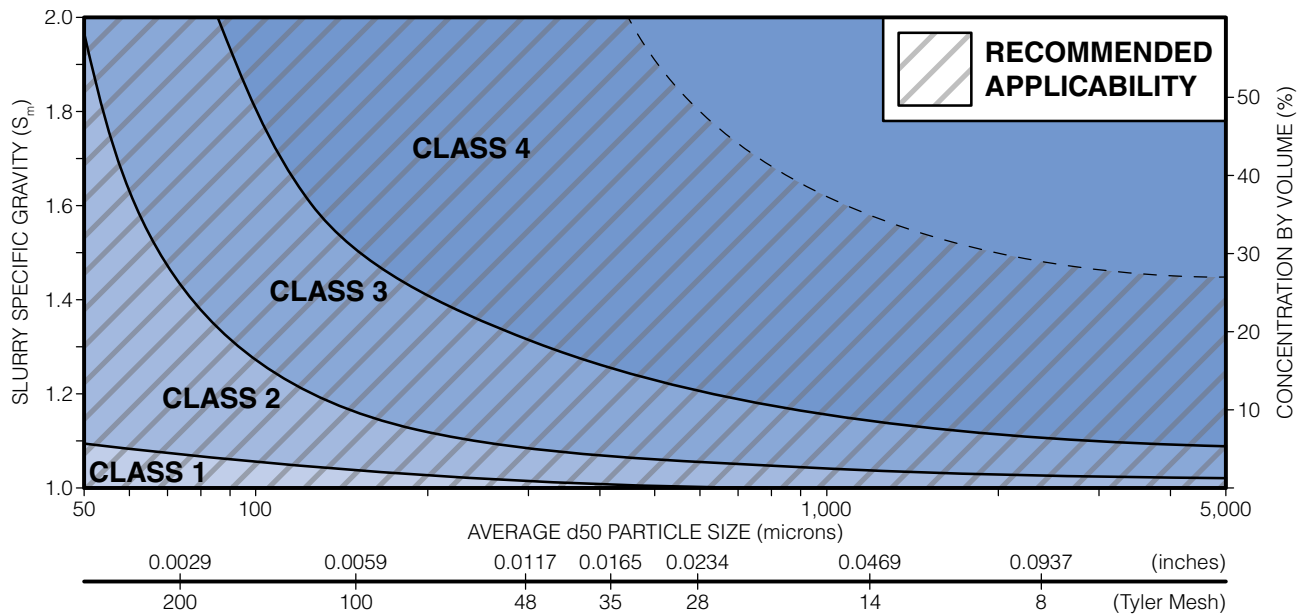
- 10 Labyrinth seals to protect internal components during wash-down cycles
- 11 Over-sized, self aligning tapered roller bearings for trouble free operation
- 12 Easy clearance adjustment to maintain efficiency and optimize hydraulic and/or expeller performance
- 13 Grease lubricated power end

Distortion free bearing clamp system ensures maximum bearing life (see page 10)

\*Available on metallic wet end only



# DESIGNED FOR CLASS 3 & 4 SLURRY SERVICES



For use as a first guide only, assumes 2.65  $s_{sol}$  silica-based solids. Adjust rating to account for solids of different abrasivity using ASTM G75-95.

Courtesy of Hydraulic Institute, Parsippany, NJ [www.pumps.org](http://www.pumps.org)

## ROBUST CONSTRUCTION

The wet end construction of the EMW<sup>®</sup> pump is built to last and features components with double the thickness of comparable medium duty slurry pumps. This type of design, combined with Wilfley's proprietary MAXALLOY<sup>®</sup> 5A hard iron and elastomer liners, creates the ideal slurry pump for abrasive applications.

## 21<sup>ST</sup> CENTURY HYDRAULICS

Wilfley used the latest computational fluid dynamics software to determine the optimal balance between hydraulic performance and wear life. This design was then validated with extensive empirical testing in the field.



# BREAKTHROUGH MATERIALS

Wilfley works discreetly with key suppliers, such as Western Foundries, to provide a variety of engineered metallurgies and proprietary processes for the longest possible pump and parts life and reliability.

## WILFLEY KNOWS METALLURGY

This also allows Wilfley to provide very competitive lead times for both complete pumps and spare parts.

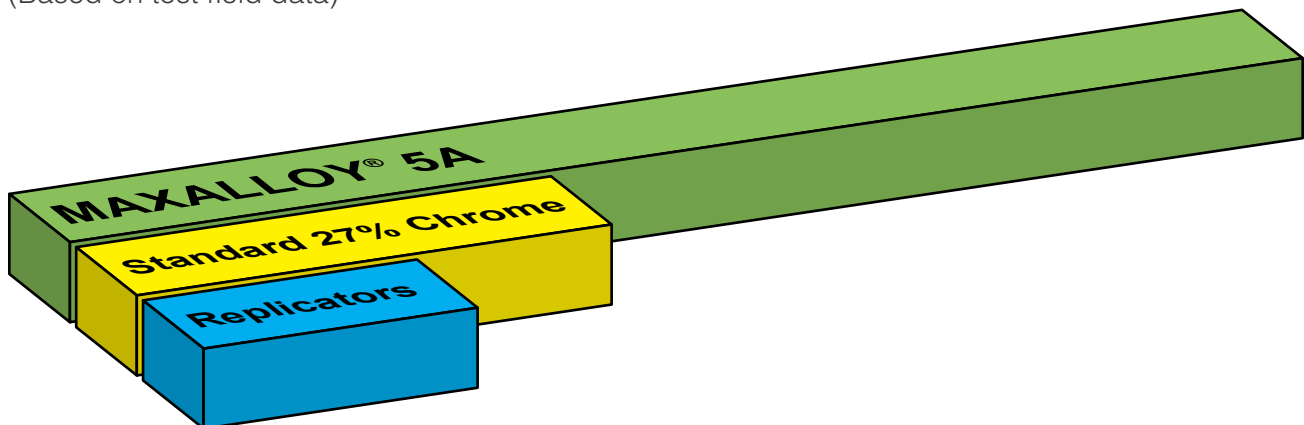
## MAXALLOY® 5A

Wilfley's proprietary MAXALLOY® 5A was developed specifically for the toughest slurry applications, combining unsurpassed hardness for wear resistance with superior toughness for durability.

Through special proprietary processing, chromium carbides are evenly distributed in a fully martensitic matrix with an average hardness of **740 HBN**. The microstructure is designed to avoid any retained austenite, delta ferrite and secondary carbides resulting in extraordinary wear performance as compared to commonly available high chrome irons.

### AVERAGE SERVICE LIFE

(Based on test field data)



# LINED WET END

## THE EMW® PUMP IS ALSO AVAILABLE WITH ELASTOMER LINED WET END CONFIGURATIONS

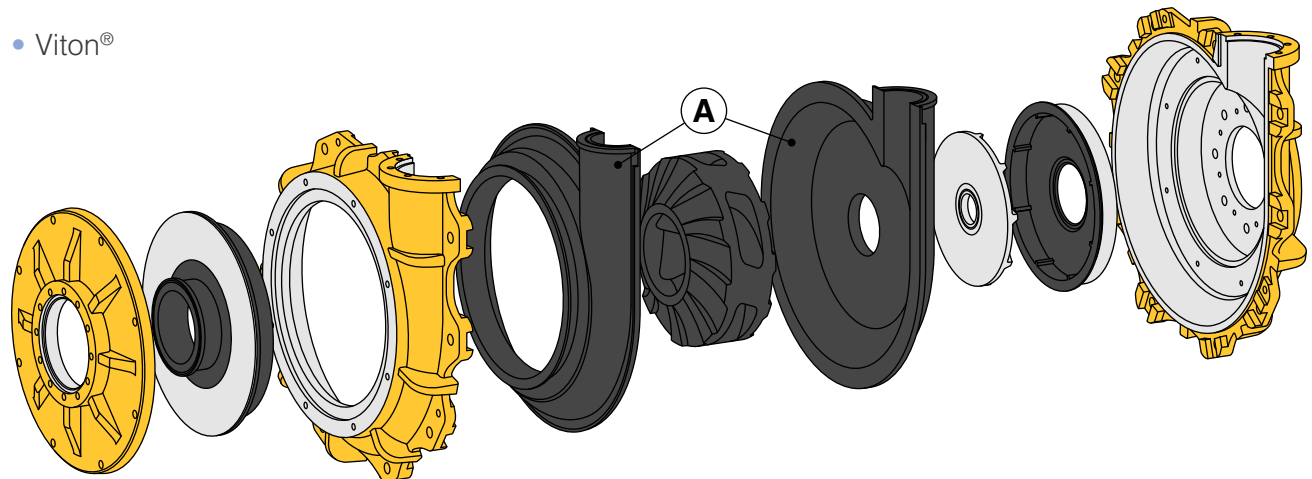
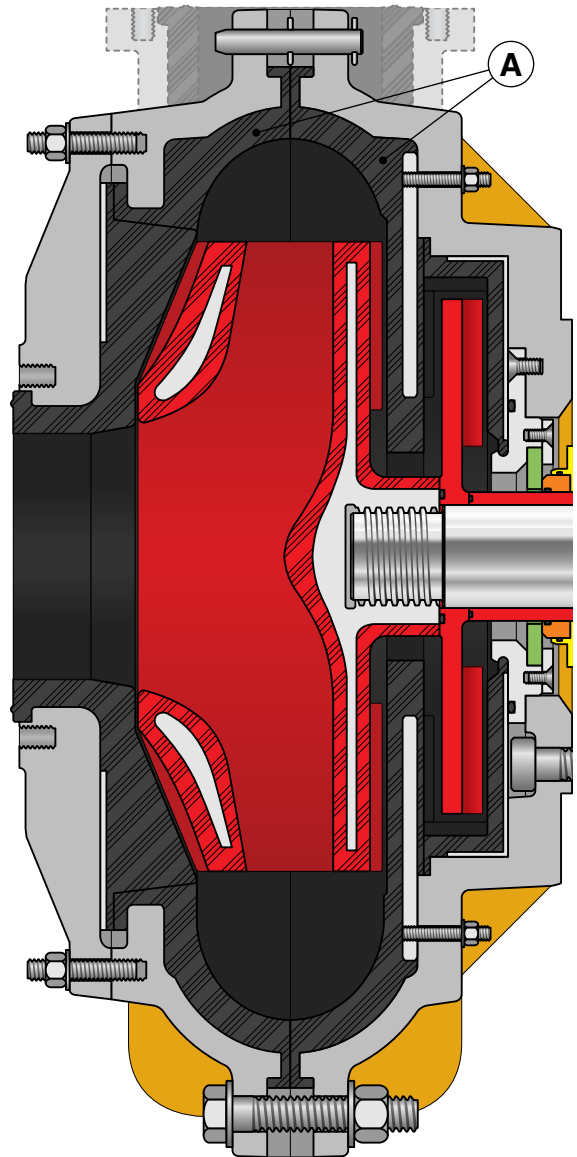
- High wear resistance
- Chemically resistant
- Replaceable wear liners (A)
- Maintenance friendly split casing
- Uses the same robust power end as the metallic wet end
- Available with the same sealing options as the metallic wet end

## APPLICABILITY

- Particle type: Spherical (non-sharp)
- Max Particle Size: 0.24 in (6 mm)
- Max Temperature: 180°F (80°C)
- Max Peripheral Speed: 5,500 ft/min (28 m/s)

## AVAILABLE MATERIALS

- Natural Rubber
- Synthetic Rubber (Butyl)
- Hypalon®
- Neoprene
- Viton®



# EXTREME DUTY POWER END

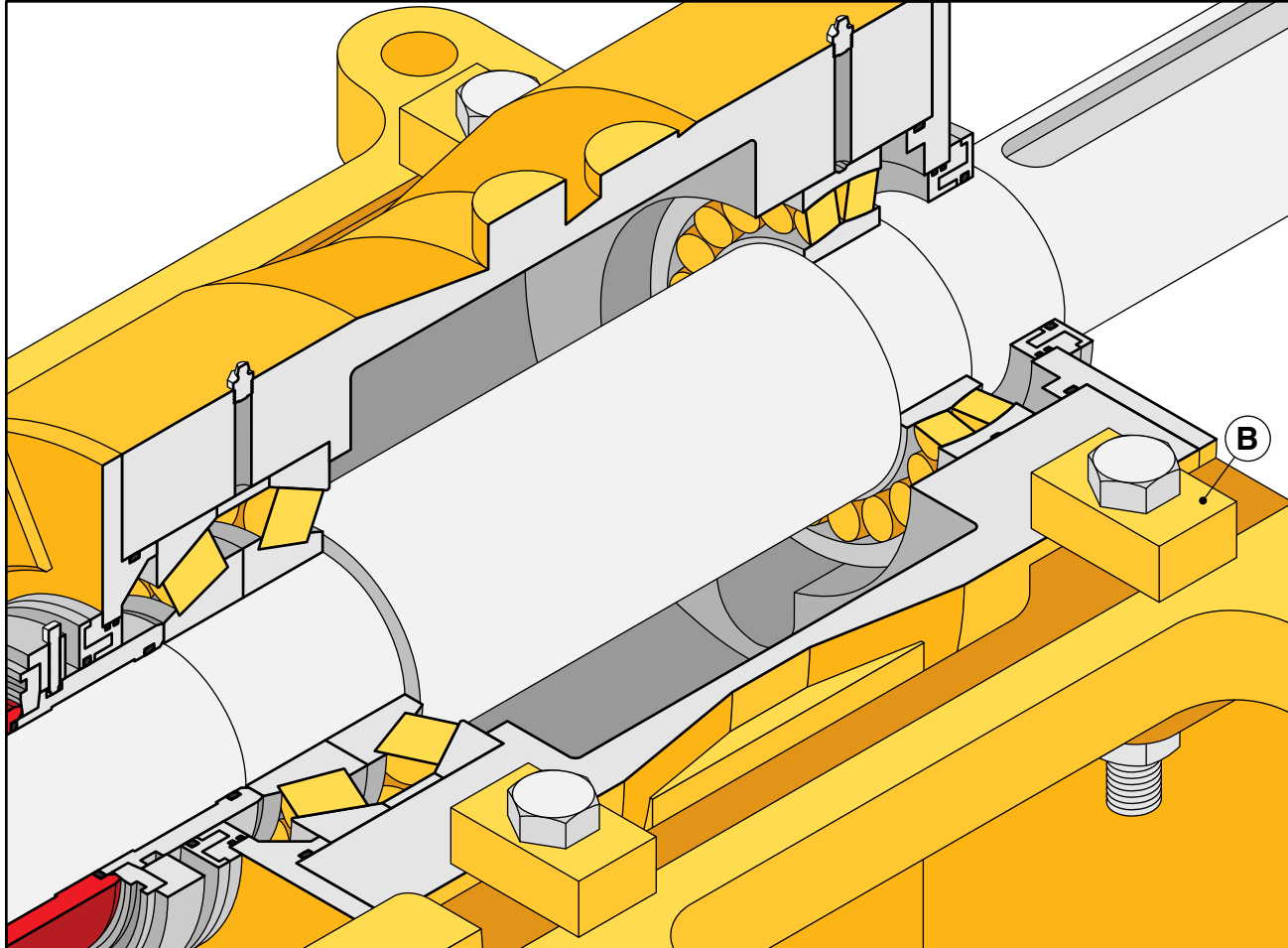
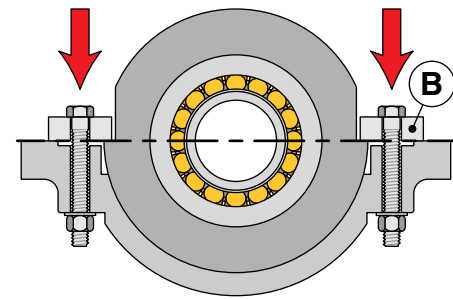
The power end of the EMW® pump has been engineered to handle the most difficult and demanding slurry applications.

## ULTRA-LOW $L^3/D^4$ SHAFT STIFFNESS RATIOS

EMW 50 2x2	EMW 75 3x3	EMW 100 4x3	EMW 150 6x4	EMW 200 8x6	EMW 250 10x8	EMW 300 12x10	EMW 350 14x12
8.6	3.6	2.6	1.3	1.0	1.1	0.7	0.9

## DISTORTION FREE BEARING CLAMP SYSTEM

The bearing cartridge is held in place with specially designed clamps **(B)**, which eliminate hoop stress on the bearings and provide distortion free operation and extended  $L_{10}$  life.

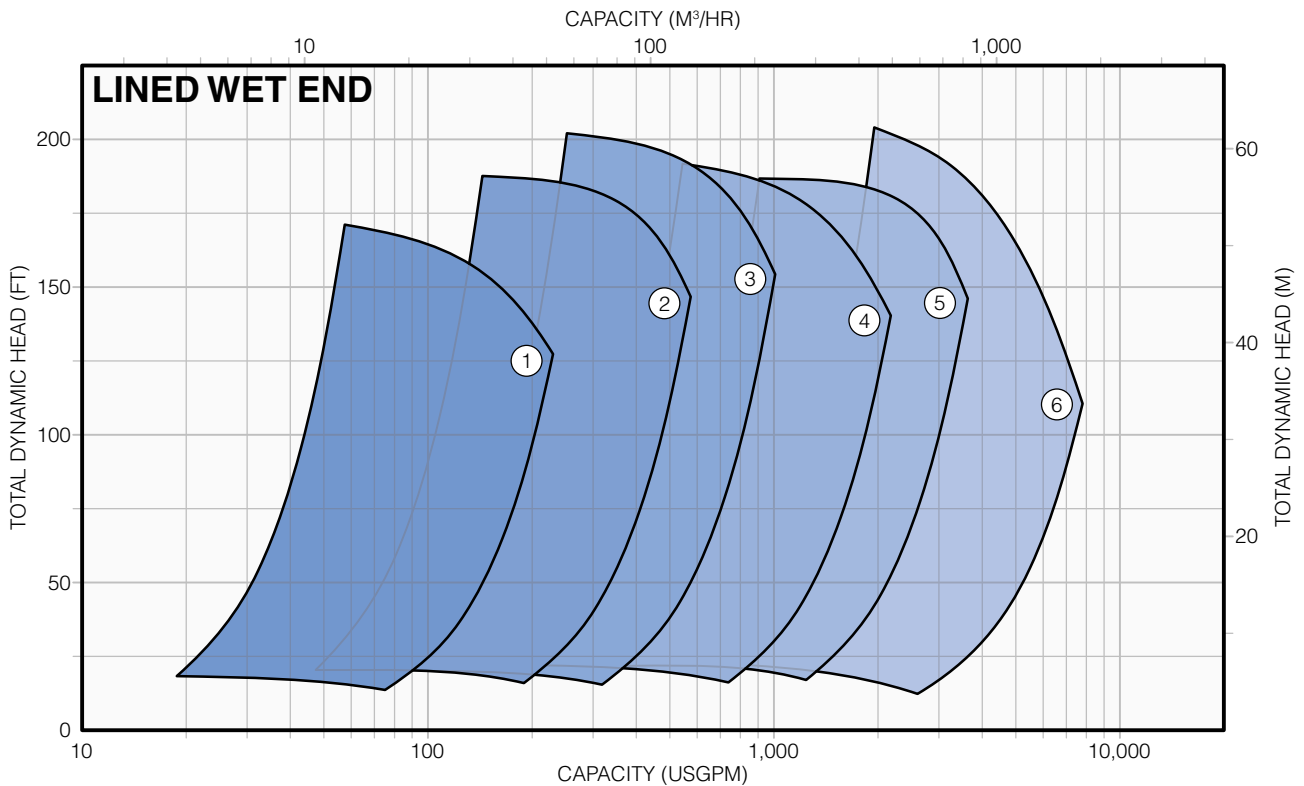
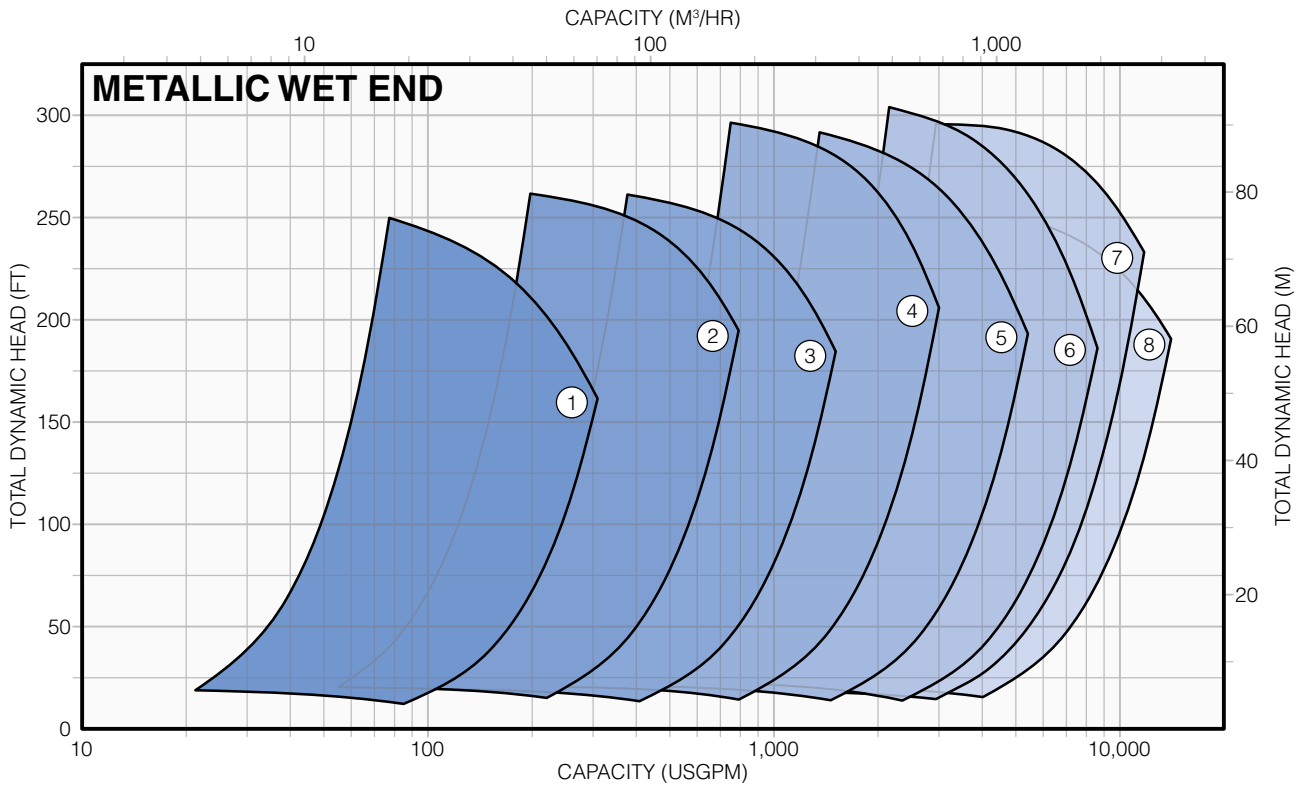


# CONSTRUCTION DETAILS

		METALLIC WET END							
		EMW 50 2x2	EMW 75 3x3	EMW 100 4x3	EMW 150 6x4	EMW 200 8x6	EMW 250 10x8	EMW 300 12x10	EMW 350 14x12
<b>GENERAL</b>									
Bare Pump Weight	lbs	360	485	590	1,165	2,345	3,445	7,585	9,025
	kg	163	220	268	528	1,064	1,563	3,440	4,094
Max Passable Solids Size	in	0.71	0.79	1.57	1.97	2.36	2.76	3.74	4.33
	mm	18	20	40	50	60	70	95	110
<b>SHAFT</b>									
Diameter at Impeller	in	1.11	1.22	1.57	2.13	2.72	3.11	3.50	3.90
	mm	28	31	40	54	69	79	89	99
Diameter at Coupling	in	1.30	1.77	2.17	2.56	3.15	3.54	3.94	4.53
	mm	33	45	55	65	80	90	100	115

		LINED WET END					
		EMW 50 2x2	EMW 75 3x3	EMW 100 4x3	EMW 150 6x4	EMW 200 8x6	EMW 250 10x8
<b>GENERAL</b>							
Bare Pump Weight	lbs	310	430	615	1,095	1,930	3,485
	kg	141	195	279	497	875	1,581
Max Passable Solids Size	in	0.71	0.79	1.18	1.57	2.36	2.76
	mm	18	20	30	40	60	70
<b>SHAFT</b>							
Diameter at Impeller	in	1.11	1.22	1.57	2.13	2.72	3.11
	mm	28	31	40	54	69	79
Diameter at Coupling	in	1.30	1.77	2.17	2.56	3.15	3.54
	mm	33	45	55	65	80	90

# EMW<sup>®</sup> SLURRY PUMP CAPACITIES



- 1. EMW 50    2. EMW 75    3. EMW 100    4. EMW 150    5. EMW 200    6. EMW 250    7. EMW 300    8. EMW 350
- 2x2            3x3            4x3            6x4            8x6            10x8            12x10            14x12



# DIMENSIONS

## PUMP DIMENSIONS

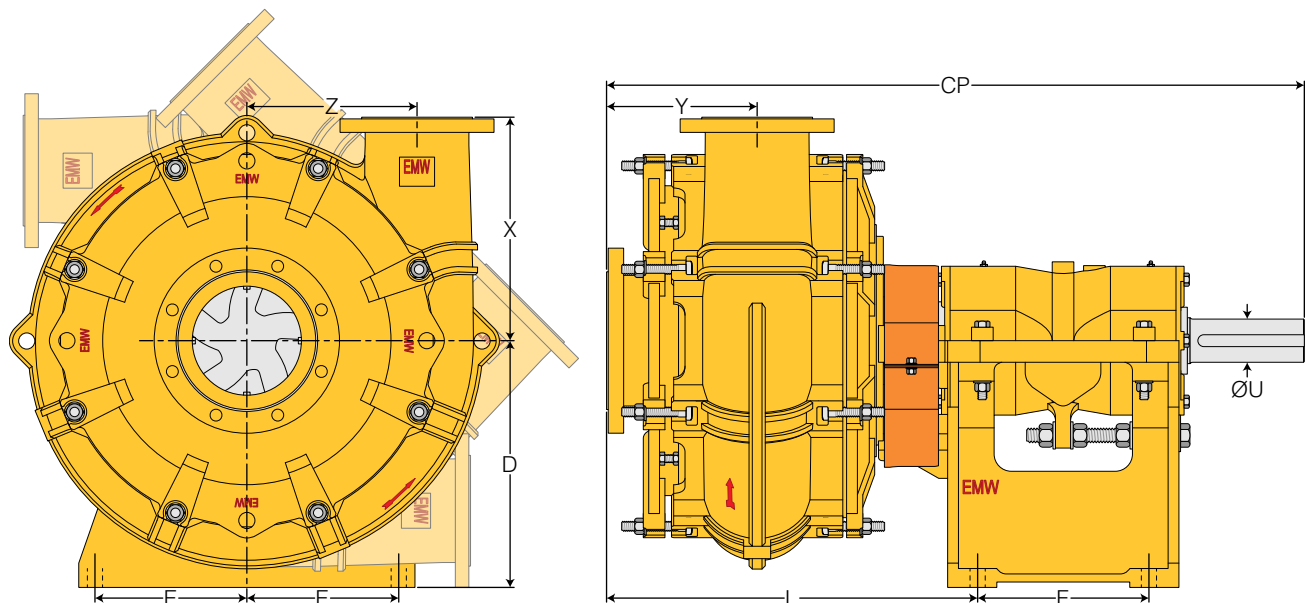
Inches (Millimeters)

Pump Size	Suction Flange	Discharge Flange	CP	D	E	F	L	U	X	Y	Z	KEYWAY
<b>METALLIC WET END</b>												
EMW 50 2x2	2 (50)	2 (50)	27 (684)	10 (254)	6.4 (161)	7.8 (197)	13.2 (335)	1.3 (33)	8.5 (215)	4.5 (114)	4.9 (123)	0.4 x 0.4 (10 x 8)
EMW 75 3x3	3 (75)	3 (75)	30.3 (769)	10 (254)	6.4 (161)	7.8 (197)	16 (404)	1.8 (45)	8.3 (209)	6 (152)	6.3 (160)	0.6 x 0.4 (14 x 9)
EMW 100 4x3	4 (100)	3 (75)	33 (837)	10 (254)	6.9 (173)	8.5 (215)	18 (457)	2.2 (55)	10.1 (255)	6.9 (173)	6.8 (172)	0.6 x 0.4 (16 x 10)
EMW 150 6x4	6 (150)	4 (100)	39.6 (1004)	13.2 (335)	8.3 (210)	9 (227)	21.8 (553)	2.6 (65)	13.3 (336)	9.1 (230)	9.6 (242)	0.7 x 0.4 (18 x 11)
EMW 200 8x6	8 (200)	6 (150)	50.9 (1291)	18 (457)	11.1 (281)	12.5 (316)	27.1 (687)	3.2 (80)	16.3 (414)	11 (278)	12.5 (315)	0.9 x 0.6 (22 x 14)
EMW 250 10x8	10 (250)	8 (200)	67.6 (1715)	24.1 (610)	17.9 (454)	21.6 (548)	31.3 (793)	3.6 (90)	19.1 (484)	12.3 (310)	14.9 (378)	1 x 0.6 (25 x 14)
EMW 300 12x10	12 (300)	10 (250)	72.3 (1835)	24.1 (610)	17.9 (454)	21.6 (548)	34.8 (882)	4.0 (100)	25.6 (650)	15.3 (388)	19.7 (500)	1.2 x 0.7 (28 x 16)
EMW 350 14x12	14 (350)	8 (300)	75.2 (1908)	24.1 (610)	17.9 (454)	21.6 (548)	38.0 (965)	4.6 (115)	28.2 (715)	16.5 (418)	22 (557)	1.3 x 0.8 (32 x 18)
<b>LINED WET END</b>												
EMW 50 2x2	2 (50)	2 (50)	26.7 (678)	10 (254)	6.4 (161)	7.8 (197)	12.7 (321)	1.3 (33)	6.9 (175)	3.6 (90)	4.9 (123)	0.4 x 0.4 (10 x 8)
EMW 75 3x3	3 (75)	3 (75)	29.2 (740)	10 (254)	6.4 (161)	7.8 (197)	14.4 (365)	1.8 (45)	8.5 (215)	4.8 (121)	6.3 (160)	0.6 x 0.4 (14 x 9)
EMW 100 4x3	4 (100)	3 (75)	32.5 (825)	10 (254)	6.9 (173)	8.5 (215)	17.2 (435)	2.2 (55)	11.2 (283)	5.8 (145)	6.8 (172)	0.7 x 0.4 (16 x 10)
EMW 150 6x4	6 (150)	4 (100)	38.5 (976)	13.2 (335)	8.3 (210)	9 (227)	20.7 (525)	2.6 (65)	14.1 (358)	7.1 (178)	9.6 (242)	0.8 x 0.5 (18 x 11)
EMW 200 8x6	8 (200)	6 (150)	48.6 (1232)	18 (457)	11.1 (281)	12.5 (316)	24.4 (618)	3.2 (80)	17.4 (440)	8.8 (221)	12.5 (315)	0.9 x 0.6 (22 x 14)
EMW 250 10x8	10 (250)	8 (200)	65.5 (1663)	24.1 (610)	17.9 (454)	21.6 (548)	29.2 (740)	3.6 (90)	20.1 (510)	10.4 (263)	14.9 (378)	1 x 0.6 (25 x 14)

These dimensions are not for construction. Certified dimension prints are available for your specific installation

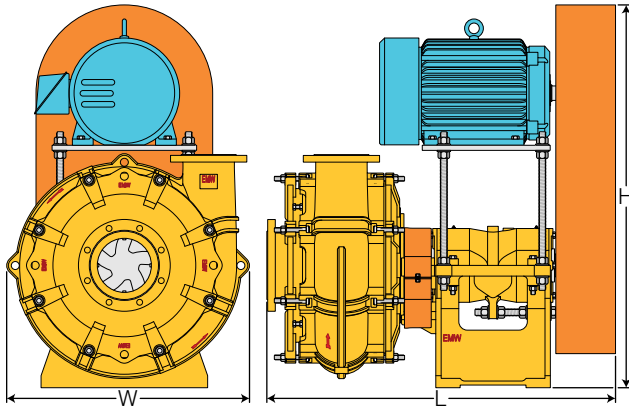
ASME/ANSI and ISO/DIN flanges available.

The discharge can rotate in 45° increments to specifically meet your needs.



# DRIVE CONFIGURATIONS

## INLINE OVERHEAD (Small Motors)

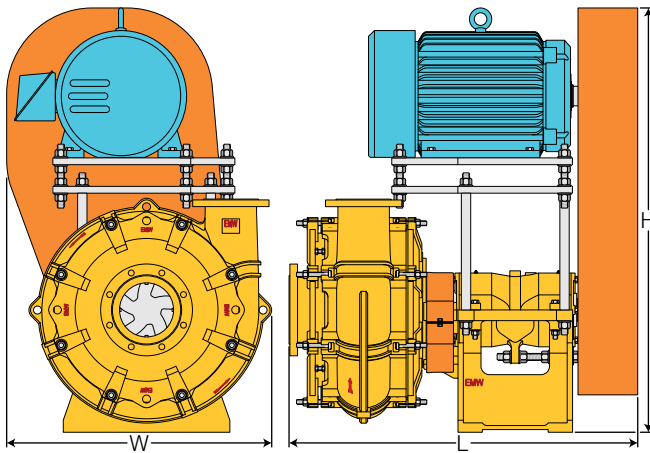


### Approximate Dimensions

Inches (Millimeters) - NEMA (IEC)

Pump Size	Motor Range	L	W	H
EMW 50 2x2	143T-213T (90S-112M)	30 (762)	21 (533)	41 (1041)
EMW 75 3x3	143T-213T (90S-112M)	33 (838)	21 (533)	41 (1041)
EMW 100 4x3	143T-215T (90S-132M)	36 (914)	21 (533)	41 (1041)
EMW 150 6x4	143T-256T (90S-132M)	46 (1168)	29 (737)	64 (1626)
EMW 200 8x6	256T-326T (160S-200L)	55 (1397)	36 (914)	68 (1727)
EMW 250 10x8	286T-405T (180S-280M)	73 (1854)	43 (1092)	75 (1905)
EMW 300 12x10	326T-445T (200M-280M)	80 (2032)	55 (1397)	85 (2159)
EMW 350 14x12	364T-447T (250S-315L)	83 (2108)	63 (1600)	100 (2540)

## OFFSET OVERHEAD (Medium Motors)

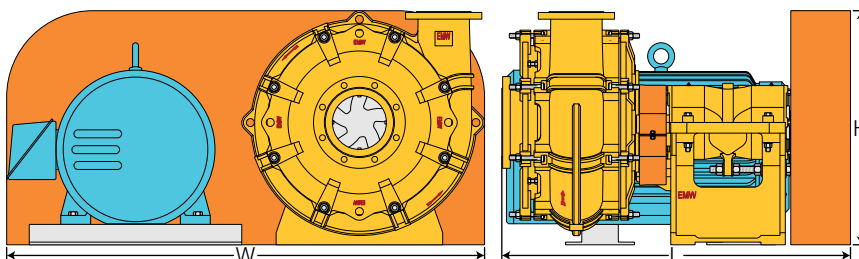


### Approximate Dimensions

Inches (Millimeters) - NEMA (IEC)

Pump Size	Motor Range	L	W	H
EMW 50 2x2	215T-405T (132S-250M)	34 (864)	32 (813)	52 (1321)
EMW 75 3x3	215T-405T (132S-250M)	35 (889)	32 (813)	52 (1321)
EMW 100 4x3	254T-405T (160M-250M)	38 (965)	32 (813)	52 (1321)
EMW 150 6x4	284T-405T (160M-250M)	44 (1118)	35 (889)	64 (1626)
EMW 200 8x6	364T-405T (225S-250M)	53 (1346)	39 (991)	69 (1753)
EMW 250 10x8	All overhead configurations are inline			
EMW 300 12x10				
EMW 350 14x12				

## SIDE BY SIDE (Large Motors)



### Approximate Dimensions

Inches (Millimeters) - NEMA (IEC)

Pump Size	Motor Range	L	W	H
EMW 50 2x2	All belt driven configurations are overhead			
EMW 75 3x3				
EMW 100 4x3	444T-449T (280S-315L)	41 (1041)	69 (1753)	29 (737)
EMW 150 6x4	444T-449T (280S-315L)	46 (1168)	75 (1905)	29 (737)
EMW 200 8x6	444T-586T (280S-355L)	60 (1524)	84 (2134)	35 (889)
EMW 250 10x8	444T-589T (315S-400L)	73 (1854)	90 (2286)	44 (1118)
EMW 300 12x10	444T-589T (315S-400L)	80 (2032)	105 (2667)	55 (1397)
EMW 350 14x12	444T-589T (315S-400L)	83 (2108)	114 (2896)	70 (1778)

Direct drive configurations are also available, contact Wilfley for more information

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**A9 Chemical Pump**



**Kpro<sup>®</sup> Slurry Pump**

**WILFLEY<sup>®</sup>**  
**HEAVY DUTY**  
**CENTRIFUGAL PUMPS**

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