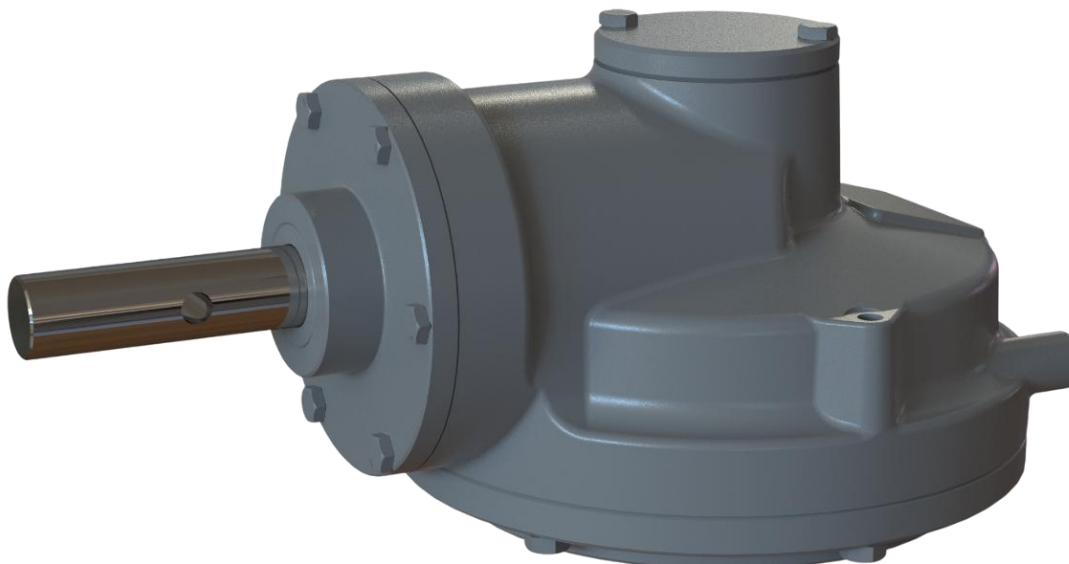


WedgeRock RB & RM PRODUCT SHEET

700105 Rev-04

COMMERCIAL BEVEL & MITER GEAR SOLUTIONS



Features, Options & Configurability

- | | |
|---|---|
| <ul style="list-style-type: none"> • Capable of reducing turns to cycle or time to close by 5X over conventional quarter-turn solutions due to increased efficiency and wide range of ratio options. • Optionally Self-Locking • Mechanical stops for quarter turn rotation, $\pm 5^\circ$ adjustment at each stop • 90% filled, Greased for life, no maintenance • Designed and tested to IP68 • Input lockout • Meets requirements of AWWA C500, C509 & C515 • Available Certifications: <ul style="list-style-type: none"> ○ BABA and other USA domestic ○ AWWA Compliant ○ ATEX Compliant | <ul style="list-style-type: none"> • Modular design accommodates; <ul style="list-style-type: none"> ○ Quarter-Turn ○ Multi-Turn ○ Rising Stem ○ Non-Rising Stem ○ Multiple Inputs • Motorized and Manual input options • Buried Service prep • Submerged prep • Risers and Adaptors • Temperature range and materials configured per application • Machined for direct mount <ul style="list-style-type: none"> ○ Standard Flanges to MSS SP101/MSS SP102 & ISO 5211/ISO 5210 ○ Custom Bolt Patterns Available |
|---|---|

PURPOSE ENGINEERED - QUALITY MANUFACTURED - PERFORMANCE TESTED

The information in this document is subject to change without notice. Updated documents can be requested or obtained from our website.

WedgeRock QUARTER-TURN RB SERIES

PERFORMANCE

While the RB bevel gear is designed for traditional multi-turn and thrust type applications, we've included some extra features. The quarter-turn version of the RB is designed with performance in mind versus traditional wormgears.



Motorized Application, Optimized **Power** Consumption

	Required Gearbox Rating	Gearbox Ratio	Gearbox Mechanical Advantage	Gearbox Efficiency	Turns to Close	Input Torque Required	Power Required
	IN-LBS (NM)					IN-LBS (NM)	HP (KW)
Standard Efficiency Wormgear	95,000 (10,735)	168	46	23%	42	2065 (233)	3.3 (2.4)
WedgeRock Bevel Gear	95,000 (10,735)	165	140	85%	41	679 (77)	1.1 (0.8)

Motorized Application, Optimized **Time** to Operate

	Required Gearbox Rating	Gearbox Ratio	Gearbox Mechanical Advantage	Gearbox Efficiency	Turns to Close	Time to Operate 1/4 Turn @ 100 RPM
	IN-LBS (NM)					Seconds
Standard Efficiency Wormgear	95,000 (10,735)	168	46	27%	42	25
WedgeRock Bevel Gear	95,000 (10,735)	55	46	85%	14	8

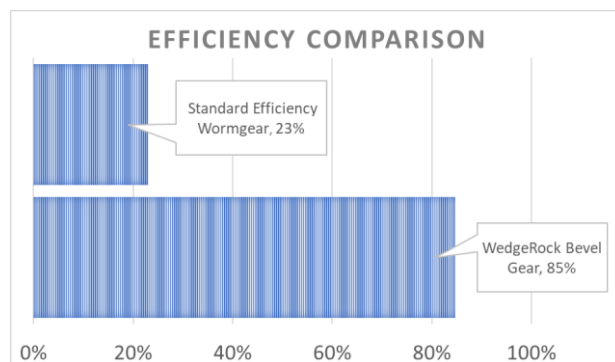
Manual Application, Optimized **Turns** to Operate

	Required Gearbox Rating	Gearbox Ratio	Gearbox Mechanical Advantage	Gearbox Efficiency	Handwheel Diameter	Turns to Operate
	IN-LBS (NM)				IN (MM)	
Standard Efficiency Wormgear	95,000 (10,735)	504	119	24%	36 (914)	126
WedgeRock Bevel Gear	95,000 (10,735)	82	70	85%	36 (914)	21

Value Proposition

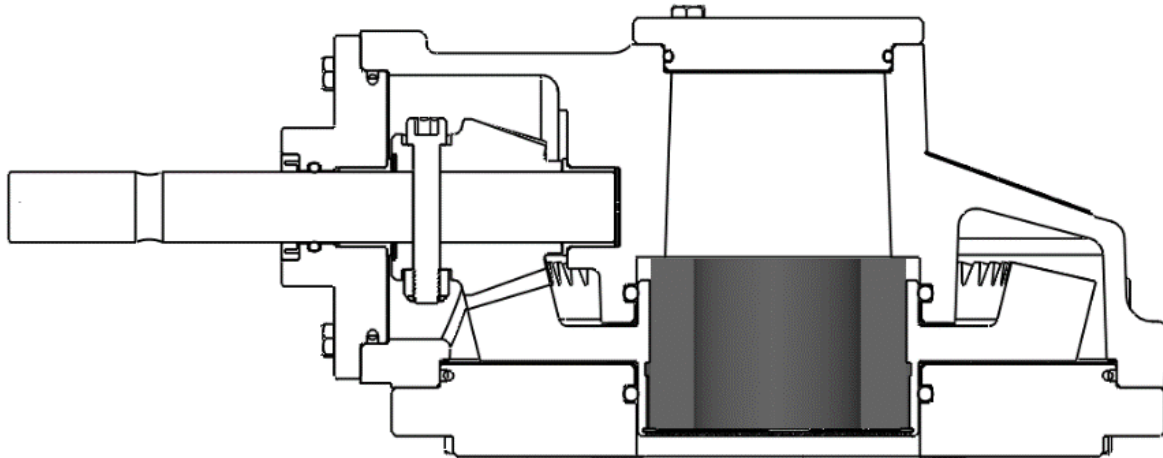
Conventional wormgears use inefficient gear design as self-locking feature. WedgeRock uses a patented mechanical bidirectional clutch called PolyLock making our high efficiency bevel gears self-locking. The PolyLock clutch allows torque from input to act on drivetrain in clockwise or counterclockwise direction while providing mechanical brake force if backdriving torque is applied to the output by valve or other actuated device.

Motorized application can be optimized using WedgeRock bevel gears, for faster close times, or reducing electric actuator frame size. Manual applications can be optimized to reduce number of turns to operate extending manually operated valve size, reducing installation and maintenance cost.



WedgeRock RB & RM SERIES

GENERAL OVERVIEW



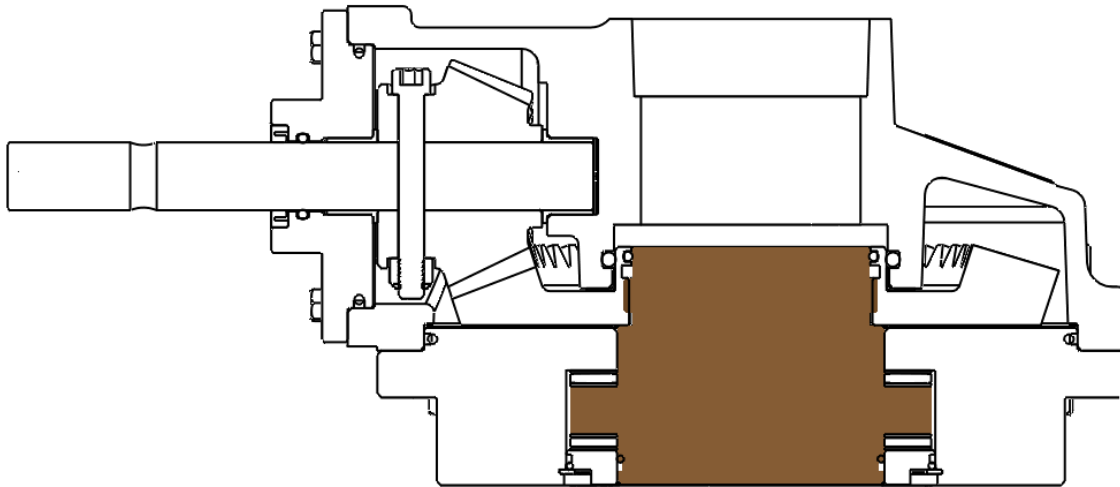
MANUAL AND MOTORIZED OPERATION, NON-RISING STEM

MODEL	TORQUE RATING		MAX BORE W/ SQUARE KEY PER ANSI B17.1	MAX BORE W/ RECTANGULAR KEY PER ANSI B17.1	MAX CIRCUMSCRIBED DIAMETER	MAX STEM ACCEPTANCE	STANDARD FLANGE
	MANUAL	MOTORIZED					
	1.5 S.F. ¹	2.0 S.F. ¹					
	IN-LBS (NM)	IN-LBS (NM)	IN (MM)	IN (MM)	IN (MM)	IN (MM)	MIN MAX
RM3	4,800 (542)	3,600 (407)	1.00 (25.4)	1.00 (25.4)	1.26 (32.1)	2.73 (69.3)	F10/FA10 F14/FA14
RB6	8,000 (904)	6,000 (678)	2.00 (50.8)	2.13 (54.0)	2.53 (64.3)	5.29 (134.4)	F10/FA10 F16/FA16
RB9	15,000 (1,695)	11,250 (1,271)	2.75 (69.9)	2.88 (73.0)	3.41 (86.6)	5.40 (137.2)	F14/FA14 F16/FA16
RB12	45,000 (5,085)	33,750 (3,814)	3.25 (82.6)	3.38 (85.7)	4.03 (102.4)	6.70 (170.2)	F16/FA16 F30/FA30
RB16	96,000 (10,848)	72,000 (8,136)	5.50 (139.7)	5.75 (146.1)	6.77 (172.0)	8.40 (213.4)	F25/FA25 F35/FA35

1) Published safety factor for gearbox design. Application should be sized to published torque rating and include any application safety factor.

WedgeRock RBT SERIES

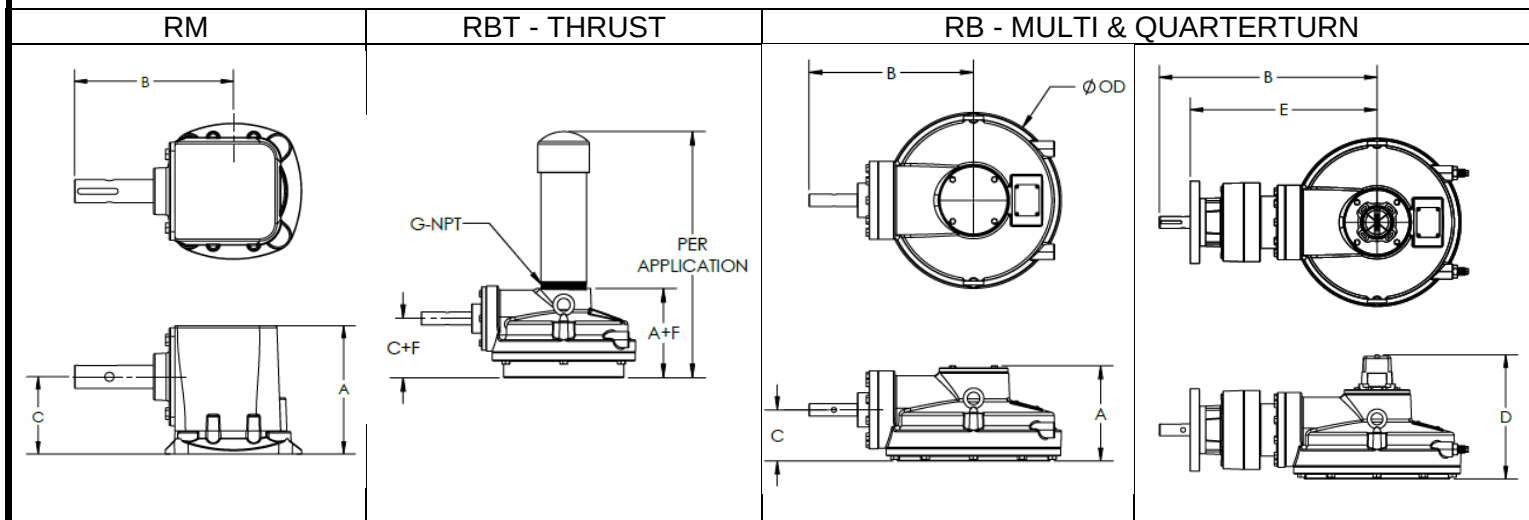
GENERAL OVERVIEW



MANUAL AND MOTORIZED OPERATION, RISING STEM					
MODEL	TORQUE RATING		THRUST RATING	MAX THREAD DIAMETER ²	STANDARD FLANGE
	MANUAL	MOTORIZED			
	1.5 S.F. ¹	2.0 S.F. ¹			
	IN-LBS (NM)	IN-LBS (NM)	LBS (N)	IN (MM)	MIN MAX
RBT6	8,000 (904)	6,000 (678)	40,000 177,929	2.00 (50.8)	F10/FA10 F16/FA16
RBT9	15,000 (1,695)	11,250 (1,271)	60,000 266,893	3.00 (76.2)	F14/FA14 F16/FA16
RBT12	45,000 (5,085)	33,750 (3,814)	80,000 355,858	4.00 (101.6)	F16/FA16 F30/FA30
RBT16	96,000 (10,848)	72,000 (8,136)	115,000 511,546	6.00 (152.4)	F25/FA25 F35/FA35
1) Published safety factor for gearbox design. Application should be sized to published torque rating and include any application safety factor. 2) Max thread diameter if using a schedule 40 sized pipe for valve stem cover.					

WedgeRock RB & RM SERIES

ENVELOPE DIMENSIONS



ENVELOPE DIMENSIONS AND WEIGHT

MODEL	A	B	C	D	E	F	G	OD	WEIGHT
	IN (MM)	IN (MM)	IN (MM)	IN (MM)	IN (MM)	IN (MM)	IN (MM)	IN (MM)	LBS (KG)
RM3	5.5 (141)	6.9 (174)	3.3 (85)		5.0 (126)			6.5 (165)	20 (9)
RB6	6.2 (157)	9.2 (234)	3.4 (85)	9.0 (229)	7.1 (181)	0.5 (13)	2" NPT	6.6 (168)	47 (21)
RB6 + RP5	6.2 (157)	14.5 (369)	3.4 (85)	9.0 (229)	12.0 (304)	0.5 (13)	2" NPT	6.6 (168)	76 (34)
RB9	6.4 (162)	10.9 (278)	3.5 (90)	9.2 (232)	8.0 (203)	0.5 (12)	3" NPT	11.0 (279)	78 (35)
RB9 + RP5	6.4 (162)	15.7 (399)	3.5 (90)	9.2 (232)	12.8 (326)	0.5 (12)	3" NPT	11.0 (279)	108 (49)
RB12	7.6 (193)	13.2 (335)	4.1 (104)	10.4 (264)	10.6 (270)	0.8 (19)	4" NPT	14.1 (358)	156 (71)
RB12 + RP6 + RP5	7.6 (193)	21.7 (551)	4.1 (104)	10.4 (264)	19.1 (485)	1.0 (25)	4" NPT	14.1 (358)	219 (99)
RB16	9.7 (245)	15.6 (396)	5.0 (126)	12.5 (317)	12.8 (325)	0.8 (19)	6" NPT	19.0 (483)	366 (166)
RB16 + RP6 + RP5	9.7 (245)	24.1 (611)	5.0 (126)	12.5 (317)	21.3 (540)	1.0 (25)	6" NPT	19.0 (483)	429 (195)

WedgeRock RP & SPUR SERIES

AUXILIARY GEAR ASSEMBLIES



MODEL	INPUT SHAFT DIAMETER (KEY PER ANSI B17.1)	MIN STANDARD INPUT FLANGE	MAX STANDARD INPUT FLANGE
	IN (MM)		
RP5	1.00 / 1.50 (25.4 / 38.1)	F/FA10	F/FA16
RP6	1.00 / 1.50 (25.4 / 38.1)	F/FA14	F/FA16

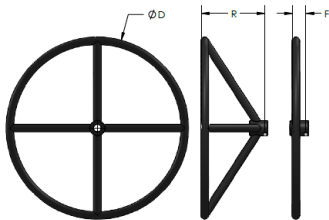
COMMON RP RATIOS FOR ALL FRAME SIZES

RATIO* [MOST COMMON]	2.50	[2.6]	2.71	2.78	2.85	[3.00]	3.18	[3.29]	3.40	3.67	4.00	[4.20]	4.43	[5.00]	5.80	[6.33]	[9.00]
MECHANICAL ADVANTAGE** [MOST COMMON]	2.4	[2.5]	2.6	2.7	2.8	[2.9]	3.1	[3.2]	3.3	3.6	3.9	[4.1]	4.3	[4.9]	5.6	[6.1]	[8.7]

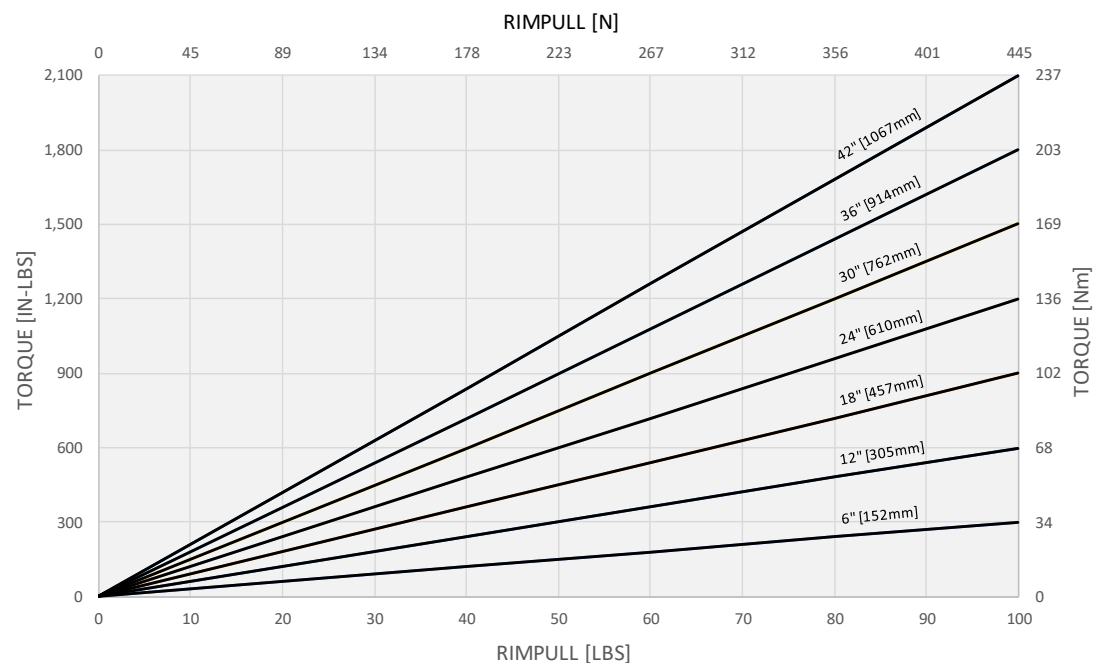
*Additional ratios available upon request.

**Mechanical advantage can fall short of published value by 10% until gearbox has worn in. Wear in should occur within 10 cycles.

WedgeRock HANDWHEELS



HANDWHEEL SIZE CHART



D	R	F
IN	IN	IN
(MM)	(MM)	(MM)
6	5.25	1.75
(152)	(133)	(44)
12	5.25	1.75
(305)	(133)	(44)
18	6.25	1.75
(457)	(159)	(44)
24	8.38	1.75
(610)	(213)	(44)
30	10.00	1.75
(762)	(254)	(44)
36	9.63	1.75
(914)	(244)	(44)
42	10.13	1.75
(1,067)	(257)	(44)

MODEL	Torque Rating In-Lbs/(Nm)	Gear Ratio						Mechanical Advantage +/- 10%						Input Torque In-Lbs/(Nm)					
RM3	3,600 (407)	1.0						0.9						4235 (479)					
RB6	6,000 (678)	2.0	3.0	4.0	6.0			1.7	2.6	3.4	5.1			3529 (399)	2353 (266)	1765 (199)	1176 (133)		
RB6 + RP5	6,000 (678)	5.2	6.0	8.4	10	13	18	4.3	4.9	6.9	8.2	10	15	1399 (158)	1213 (137)	866 (98)	728 (82)	575 (65)	404 (46)
RB9	11,250 (1271)	3.0	4.0	6.0				2.6	3.4	5.1				4412 (499)	3309 (374)	2206 (249)			
RB9 + RP5	11,250 (1271)	7.8	9.0	13	15	19	27	6.4	7.4	10	12	16	22	1749 (198)	1516 (171)	1083 (122)	910 (103)	719 (81)	505 (57)
RB12	33,750 (3814)	3.0	4.0	5.0	6.0			2.6	3.4	4.3	5.1			13235 (1496)	9926 (1122)	7941 (897)	6618 (748)		
RB12 + RP6 + RP5	33,750 (3814)	7.8	9.0	13	15	19	27	6.4	7.4	10	12	16	22	5248 (593)	4548 (514)	3249 (367)	2729 (308)	2156 (244)	1516 (171)
RB12 + RP6 + RP5	33,750 (3814)	20	23	33	39	49	70	16	19	26	31	39	56	2081 (235)	1803 (204)	1288 (146)	1082 (122)	855 (97)	601 (68)
RB16	72,000 (8136)	4.0	5.0	6.0	8.0			3.4	4.3	5.1	6.8			21176 (2393)	16941 (1914)	14118 (1595)	10588 (1196)		
RB16 + RP6 + RP5	72,000 (8136)	10	12	17	20	25	36	8.6	10	14	16	21	30	8397 (949)	7277 (822)	5198 (587)	4366 (493)	3449 (390)	2426 (274)
RB16 + RP6 + RP5	72,000 (8136)	44	50	71	84	106	151	35	40	56	67	85	121	2061 (233)	1786 (202)	1276 (144)	1072 (121)	847 (96)	595 (67)

MODEL	Torque Rating In-Lbs/(Nm)	Gear Ratio						Mechanical Advantage +/- 10%						Input Torque In-Lbs/(Nm)					
RM3	4,800 (542)	1.0						0.9						5647 (638)					
RB6	8,000 (904)	2.0	3.0	4.0	6.0			1.7	2.6	3.4	5.1			4706 (532)	3137 (354)	2353 (266)	1569 (177)		
RB6 + RP5	8,000 (904)	5.2	6.0	8.4	10	13	18	4.3	4.9	6.9	8.2	10	15	1866 (211)	1617 (183)	1155 (131)	970 (110)	766 (87)	539 (61)
RB9	15,000 (1695)	3.0	4.0	6.0				2.6	3.4	5.1				5882 (665)	4412 (499)	2941 (332)			
RB9 + RP5	15,000 (1695)	7.8	9.0	13	15	19	27	6.4	7.4	10	12	16	22	2332 (264)	2021 (228)	1444 (163)	1213 (137)	958 (108)	674 (76)
RB12	45,000 (5085)	3.0	4.0	5.0	6.0			2.6	3.4	4.3	5.1			17647 (1994)	13235 (1496)	10588 (1196)	8824 (997)		
RB12 + RP6 + RP5	45,000 (5085)	7.8	9.0	13	15	19	27	6.4	7.4	10	12	16	22	6997 (791)	6064 (685)	4332 (489)	3639 (411)	2874 (325)	2021 (228)
RB12 + RP6 + RP5	45,000 (5085)	20	23	33	39	49	70	16	19	26	31	39	56	2774 (314)	2405 (272)	1718 (194)	1443 (163)	1140 (129)	802 (91)
RB16	96,000 (10847)	4.0	5.0	6.0	8.0			3.4	4.3	5.1	6.8			28235 (3190)	22588 (2552)	18824 (2127)	14118 (1595)		
RB16 + RP6 + RP5	96,000 (10847)	10	12	17	20	25	36	8.6	10	14	16	21	30	11196 (1265)	9703 (1096)	6931 (783)	5822 (658)	4599 (520)	3234 (365)
RB16 + RP6 + RP5	96,000 (10847)	44	50	71	84	106	151	35	40	56	67	85	121	2748 (311)	2382 (269)	1701 (192)	1429 (161)	1129 (128)	794 (90)

- Actual mechanical advantage may be up to 10% lower than the published value until the gearbox has properly worn in. Full wear-in typically occurs within the first 10 operating cycles.

Useful Equations			
$\#_{in}$ = INPUT TURNS TO OPERATE ¼ TURN D_{hw} = HANDWHEEL DIAMETER MA = MECHANICAL ADVANTAGE N = GEAR RATIO F_{rp} = RIMPULL RPM = INPUT RPM $T_{1/4}$ = TIME TO OPERATE ¼ TURN (SECONDS) T_{in} = INPUT TORQUE T_{out} = OUTPUT TORQUE	Required Rimpull $F_{rp} = \frac{2 \times T_{in}}{D_{hw}}$	Mechanical Advantage $MA = \frac{T_{out}}{T_{in}}$	Input turns to operate ¼ turn $\#_{in} = \frac{N}{4}$
	Required Handwheel Diameter $D_{hw} = \frac{2 \times T_{in}}{F_{rp}}$	Required Input Torque $T_{in} = \frac{T_{out}}{MA}$	Time to operate ¼ turn (Seconds) $T_{1/4} = \frac{15 \times N}{RPM}$

WedgeRock RB & RM SERIES

SERVICE CONDITIONS

STANDARD COMPONENT MATERIAL SELECTION FOR SPECIFIED ENVIRONMENTS				
COMPONENT	SERVICE CONDITION			
	STANDARD PIPELINE		OFFSHORE	DISTRICT HEATING
	TOPSIDE	BURIED	PLATFORM	CORROSIVE
HOUSING/BASEPLATE	DUCTILE IRON	DUCTILE IRON	DUCTILE IRON	BRONZE
BEVEL GEAR	DUCTILE IRON	DUCTILE IRON	DUCTILE IRON	DUCTILE IRON
BEVEL PINION	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
INDICATOR (QUARTER TURN)	316SS	DUCTILE IRON COVER	316SS	BRONZE
INPUT SHAFT	QPQ COATED STEEL OR STAINLESS	QPQ COATED STEEL OR STAINLESS	QPQ COATED STEEL OR STAINLESS	SUPER DUPLEX STAINLESS STEEL
STEM COVER (RISING STEM)	STEEL	STEEL	STEEL	STEEL
DRIVE NUT (RISING STEM)	BRONZE	BRONZE	BRONZE	BRONZE
OUTPUT DRIVER (NON RISING STEM)	STEEL	STEEL	STEEL	STEEL
STOPS (QUARTER TURN)	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
JAM NUTS (QUARTER TURN)	STEEL	SEALED STEEL	SEALED STEEL	SEALED BRONZE
FASTENERS ¹	STEEL	STEEL	316SS	316SS
SEALS ²	BUNA / SEALENT	BUNA / SEALENT	BUNA / SEALENT	BUNA / SEALENT
LUBRICATION ³	GREASE	GREASE	GREASE	GREASE
FINISH ⁴	EPOXY PRIMER	EPOXY PRIMER	EPOXY PRIMER	N/A
1) Standard fasteners for application. Option to use Grade 5, 316SS, B7(M), L7(M), Monel, or other materials per project specification. Grade 5 is zinc plated.				
2) Standard seals for application unless otherwise specified. Refer to temperature service condition table.				
3) Lubrication per temperature condition. Refer to temperature service condition table.				
4) Standard finish unless otherwise specified. Standard epoxy 7-10 mils dft.				

WedgeRock RB SERIES

TEMPERATURE AND SERVICE CONDITIONS

Explosion Protection

Available explosion protection configuration conforms to ATEX requirements for T3 or T4. The following is the standard ATEX rating:

II 2 G Ex h IIB T4 Gb
 II 2 D Ex h IIIC T135°C Db

Enclosure Protection

The standard RB has been verified to meet IP68 requirements, ensuring sealing integrity when submerged in water at depths greater than 1 m. The unit is suitable for uncompensated subsea operation to 100 m and for compensated applications to depths exceeding 6,000 m.

Ambient Temperature Rating

TEMPERATURE SERVICE CONDITIONS		
SERVICE CONDITION	MIN OPERATING TEMP	MAX OPERATING TEMP
	°F (°C)	°F (°C)
STANDARD SERVICE	-40 (-40)	225 (107)
HIGH TEMPERATURE SERVICE	-15 (-26)	400 (204)
LOW TEMPERATURE SERVICE	-60 (-51)	225 (107)
ATEX T4 STANDARD	-31 (-35)	160 (70)
ATEX T4 EXTENDED	-60 (-51)	160 (70)
Wider operating temperature ranges are available. Consult with factory.		

Other RB Configurations

RB Multi Inputs

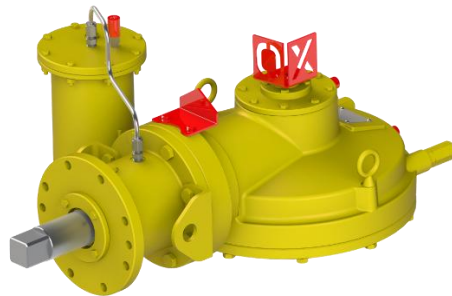


RB bevel gear with multiple inputs:

- Two inputs at 90°
- Two inputs at 180°
- Three inputs at 90°

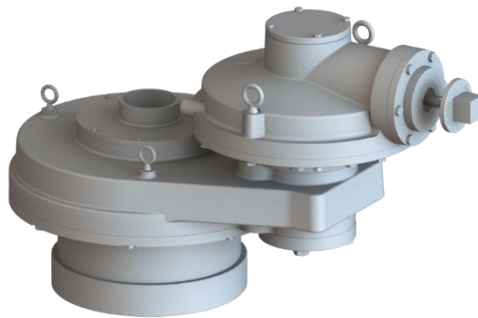


Subsea RB



RB can be engineered for difficult applications including subsea service.

RB with RSP-Spur



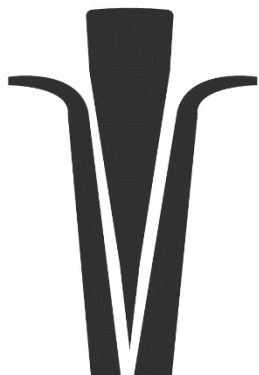
RB mounted on a larger RSP spur to increase torque and thrust capacity for rising stem applications.

RB with RP-Planetary

RB mounted to a larger RP planetary gear to increase torque capacity for quarter-turn and multi-turn applications.



ABOUT WEDGEROCK



The WedgeRock name and logo symbolize the elegance of a simple and effective design and the grit, focus, and determination required to make things happen – the work required to get big things moving. Pragmatism and hard work are central to our culture and reflected in everything we do.

Don't let our dirty hands and old school approach fool you. WedgeRock brings industry leading innovation to your engineered projects in standard lead times.

With a focused approach, WedgeRock provides solutions for the most demanding torque and thrust application. Whether you need to operate valves thousands of meters below the ocean surface, or a purpose designed gear operator for your valve line, give us a call or send an email to get the partnership started.

OUR MISSION

WedgeRock provides performance engineered actuation solutions for demanding applications.

