

WedgeRock RB & RM PRODUCT SHEET

700105 Rev-03

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"> ○ Buy America Compliant ○ 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 ○ Reversing Ratios • Motorized and Manual input options • Buried Service 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 ○ Infinite Custom Bolt Pattern Options |
|---|---|

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

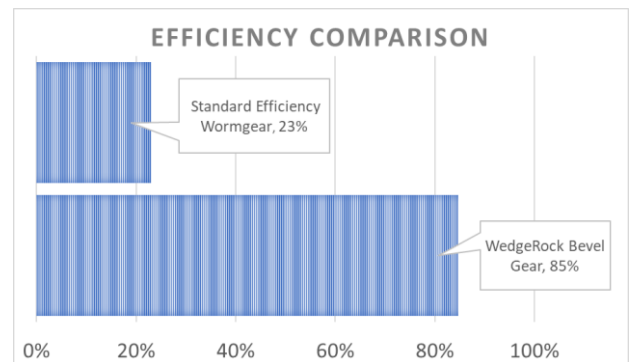
Manual Application, Optimized **Turns** to Operate

	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

MODEL	TORQUE RATING				OPTIONAL THRUST RATING	MAX BORE W/ SQUARE KEY PER ANSI B17.1	MAX THREAD DIAMETER	MAX STEM ENGAGEMENT	STANDARD FLANGE
	QUARTER-TURN		MULTI-TURN						
	MANUAL ¹	MOTORIZED ²	MANUAL ³	MOTORIZED ⁴					
	IN-LBS (NM)	IN-LBS (NM)	IN-LBS (NM)	IN-LBS (NM)	LBS (N)	IN (MM)	IN (MM)	IN (MM)	MIN MAX
RM3			3,600 (407)	2,154 (243)		1.00 (25.4)		2.73 (69.3)	F10/FA10 F14/FA14
RB9	15,000 (1,695)	11,250 (1,271)	9,000 (1,017)	7,500 (848)	60,000 266,893	3.00 (76.2)	3.00 3.5	5.30 (134.6)	F14/FA14 F16/FA16
RB12	45,000 (5,085)	33,750 (3,814)	27,000 (3,051)	22,500 (2,543)	80,000 355,858	3.50 (88.9)	3.50 (88.9)	5.80 (147.3)	F16/FA16 F30/FA30
RB16	96,000 (10,848)	72,000 (8,136)	57,600 (6,509)	48,000 (5,424)	115,000 511,546	4.00 (101.6)	4.00 (101.6)	6.80 (172.7)	F25/FA25 F35/FA35

1) Ratings for 1,000 quarter-turn cycles

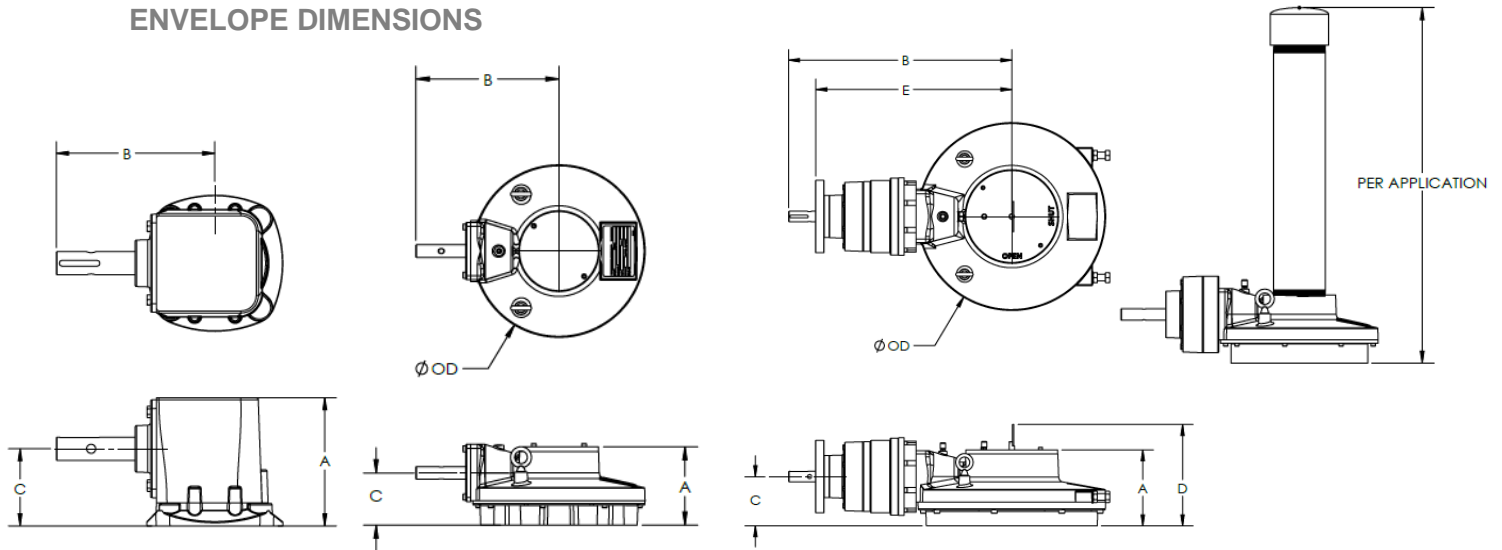
2) Ratings for 10,000 quarter-turn cycles

3) Ratings for 5,000 multi-turn cycles

4) Ratings for 100,000 multi-turn cycles

WedgeRock RB & RM SERIES

ENVELOPE DIMENSIONS



RB & RM ENVELOPE DIMENSIONS AND WEIGHT

MODEL	A	B	C	D	E	OD	WEIGHT
	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)
RB9	5.7 (145)	9.2 (234)	3.7 (93)	8.0 (204)	6.6 (167)	8.4 (214)	55 (25)
RB9 + SPUR	5.7 (145)	12.3 (311)	3.7 (93)	8.0 (204)	10.8 (273)	8.4 (214)	63 (29)
RB9 + RP5	5.7 (145)	13.5 (343)	3.7 (93)	8.0 (204)	11.1 (283)	8.4 (214)	80 (36)
RB12	6.2 (157)	11.3 (287)	4.1 (105)	8.5 (215)	8.3 (211)	13.6 (346)	116 (53)
RB12 + SPUR	6.2 (157)	14.5 (367)	4.1 (105)	8.5 (215)	13.4 (341)	13.6 (346)	124 (56)
RB12 + RP5	6.2 (157)	15.6 (395)	4.1 (105)	8.5 (215)	12.9 (327)	13.6 (346)	141 (64)
RB12 + RP6 + RP5	6.2 (157)	19.1 (486)	4.1 (105)	8.5 (215)	16.5 (420)	13.6 (346)	161 (73)
RB16	7.2 (183)	15.2 (386)	4.7 (119)	9.6 (245)	10.5 (267)	17.8 (452)	215 (98)
RB16 + RP6	7.2 (183)	20.5 (522)	4.7 (119)	9.6 (245)	17.9 (456)	17.8 (452)	257 (117)
RB16 + RP6 + RP5	7.2 (183)	21.2 (539)	4.7 (119)	9.6 (245)	18.6 (474)	17.8 (452)	260 (118)

WedgeRock RP & SPUR SERIES

AUXILIARY GEAR ASSEMBLIES



REDUCTION GEARS FOR RC			
MODEL	INPUT SHAFT DIAMETER (KEY PER ANSI B17.1)	MIN STANDARD INPUT FLANGE	MAX STANDARD INPUT FLANGE
	IN (MM)		
RC Spur	0.75 (19.1)	F/FA07	F/FA14
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

RC SPUR RATIOS		
RATIO	2.20	3.30
MECHANICAL ADVANTAGE**	2.0	3.0

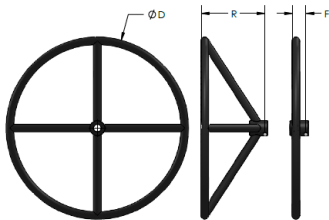
COMMON RP RATIOS FOR ALL FRAME SIZES

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]

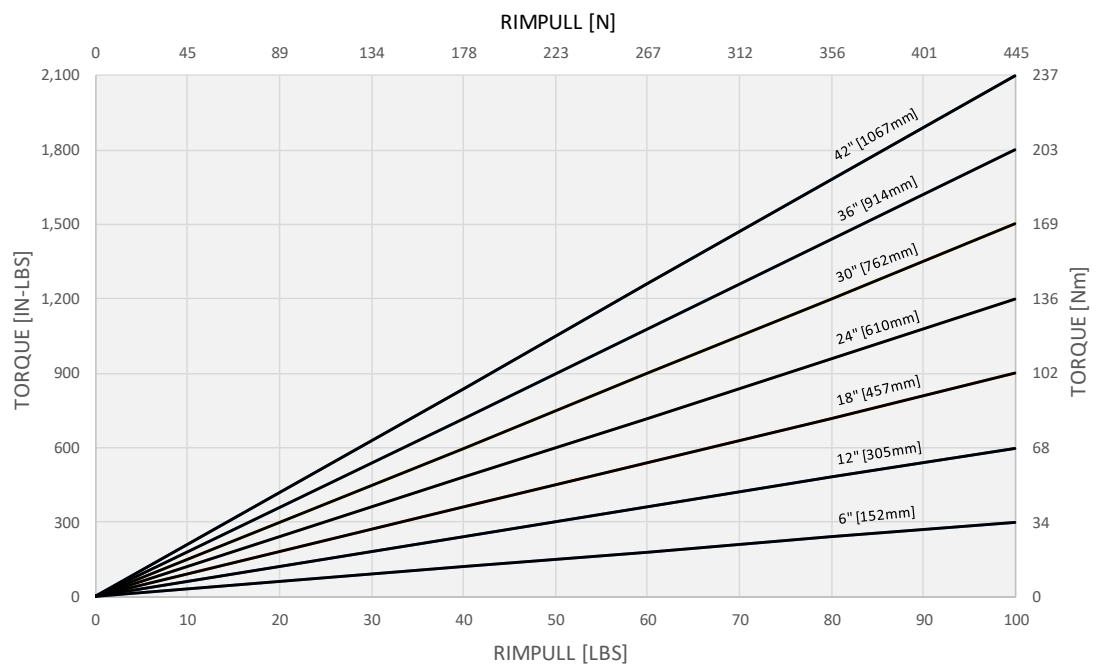
* Additional ratios available upon request.

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

WedgeRock HANDWHEELS



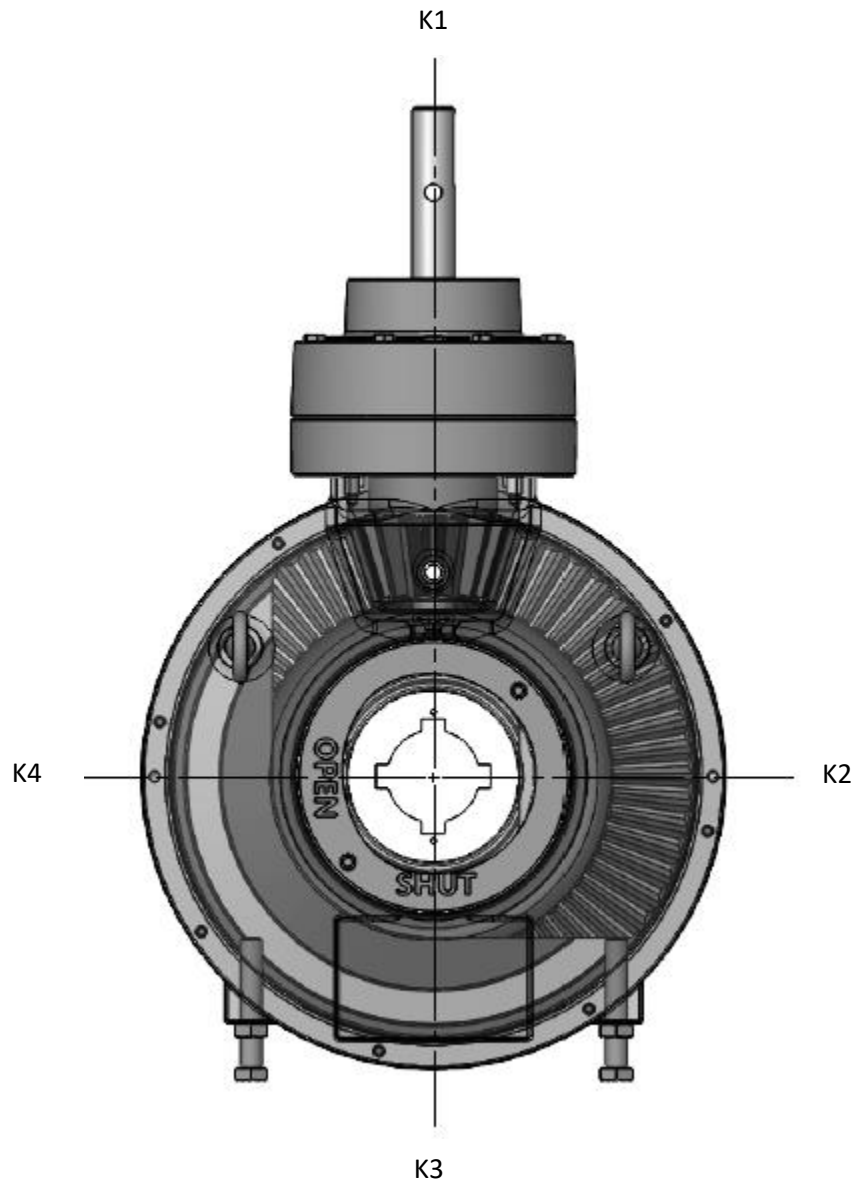
HANDWHEEL SIZE CHART



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)

WedgeRock QUARTER-TURN RB SERIES

KEYWAY POSITION



TOP VIEW, QUADRANT IN CLOSED POSITION AS SHOWN

WedgeRock RB & RM SERIES

TEMPERATURE AND SERVICE CONDITIONS

TEMPERATURE SERVICE CONDITIONS				
SERVICE CONDITION	SEAL MATERIAL	LUBRICANT	MIN OPERATING TEMP	MAX OPERATING TEMP
			°F (°C)	°F (°C)
STANDARD SERVICE	BUNA	STANDARD GREASE	-40 (-40)	225 (107)
HIGH-TEMP SERVICE	VITON	HIGH-TEMP GREASE	-15 (-26)	400 (204)
LOW-TEMP SERVICE	LOW TEMP BUNA	LOW-TEMP GREASE	-60 (-51)	225 (107)

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.

QUARTER-TURN RATING

	MODEL	Torque Rating In-Lbs/(Nm)	Gear Ratio					Mechanical Advantage +/- 10%					Input Torque In-Lbs/(Nm)									
			3	4				3	4				5556 (629)	4167 (471)								
MANUAL	RB9	15,000 (1695)	3	4				3	4				2806 (317)	2104 (238)	1871 (211)	1403 (159)						
	RB9 + SPUR	15,000 (1695)	7	9	10	13		5	7	8	11		2203 (249)	1905 (216)	1364 (154)	1145 (129)	905 (102)	636 (72)				
	RB9 + RP5	15,000 (1695)	8	9	13	15	19	27	7	8	11	13	17	24	12500 (1412)							
	RB12	45,000 (5085)	4					4					2806 (317)	1871 (211)								
	RB12 + SPUR	20,000 (2260)	9	13				7	11				4956 (560)	4296 (485)	3068 (347)	2577 (291)	2036 (230)	1432 (162)				
	RB12 + RP5	45,000 (5085)	10	12	17	20	25	36	9	10	15	17	22	31	1965 (222)	1703 (192)	1217 (137)	1022 (115)	807 (91)	568 (64)		
	RB12 + RP6 + RP5	45,000 (5085)	27	31	44	52	66	94	23	26	37	44	56	79	21333 (2411)							
	RB16	96,000 (10847)	5					5					8459 (956)	7331 (828)	5236 (592)	4399 (497)	3474 (393)	2444 (276)				
	RB16 + RP6	96,000 (10847)	13	15	21	25	32	45	11	13	18	22	28	39	2076 (235)	1799 (203)	1285 (145)	1080 (122)	853 (96)	600 (68)		
	RB16 + RP6 + RP5	96,000 (10847)	55	63	88	105	133	189	46	53	75	89	113	160								

	MODEL	Torque Rating In-Lbs/(Nm)	Gear Ratio					Mechanical Advantage +/- 10%					Input Torque In-Lbs/(Nm)									
			3	4				3	4				4167 (471)	3125 (353)								
MOTORIZED	RB9	11,250 (1271)	3	4				3	4				2104 (238)	1578 (178)	1403 (159)	1052 (119)						
	RB9 + SPUR	11,250 (1271)	7	9	10	13		5	7	8	11		1652 (187)	1432 (162)	1023 (116)	859 (97)	679 (77)	477 (54)				
	RB9 + RP5	11,250 (1271)	8	9	13	15	19	27	7	8	11	13	17	24	9375 (1059)							
	RB12	33,750 (3814)	4					4					2104 (238)	1403 (159)								
	RB12 + SPUR	15,000 (1695)	9	13				7	11				3717 (420)	3222 (364)	2301 (260)	1933 (218)	1527 (173)	1074 (121)				
	RB12 + RP5	33,750 (3814)	10	12	17	20	25	36	9	10	15	17	22	31	1474 (167)	1277 (144)	912 (103)	766 (87)	605 (68)	426 (48)		
	RB12 + RP6 + RP5	33,750 (3814)	27	31	44	52	66	94	23	26	37	44	56	79	16000 (1808)							
	RB16	72,000 (8136)	5					5					6344 (717)	5498 (621)	3927 (444)	3299 (373)	2606 (294)	1833 (207)				
	RB16 + RP6	72,000 (8136)	13	15	21	25	32	45	11	13	18	22	28	39	1557 (176)	1350 (152)	964 (109)	810 (91)	640 (72)	450 (51)		
	RB16 + RP6 + RP5	72,000 (8136)	55	63	88	105	133	189	46	53	75	89	113	160								

MULTI-TURN RATING

	MODEL	Torque Rating In-Lbs/(Nm)	Gear Ratio					Mechanical Advantage +/- 10%					Input Torque In-Lbs/(Nm)									
			1					1					4000 (452)									
MANUAL	RM3	3,600 (407)	1					1					3333 (377)	2500 (282)								
	RB9	9,000 (1017)	3	4				3	4				1684 (190)	1263 (143)	1122 (127)	842 (95)						
	RB9 + SPUR	9,000 (1017)	7	9	10	13		5	7	8	11		1322 (149)	1145 (129)	818 (92)	687 (78)	543 (61)	382 (43)				
	RB9 + RP5	9,000 (1017)	8	9	13	15	19	27	7	8	11	13	17	24	7500 (847)							
	RB12	27,000 (3051)	4					4					3788 (428)	2525 (285)								
	RB12 + SPUR	27,000 (3051)	9	13				7	11				2974 (336)	2577 (291)	1841 (208)	1546 (175)	1221 (138)	859 (97)				
	RB12 + RP5	27,000 (3051)	10	12	17	20	25	36	9	10	15	17	22	31	1179 (133)	1022 (115)	730 (82)	613 (69)	484 (55)	341 (38)		
	RB12 + RP6 + RP5	27,000 (3051)	27	31	44	52	66	94	23	26	37	44	56	79	12800 (1446)							
	RB16	57,600 (6508)	5					5					5075 (573)	4399 (497)	3142 (355)	2639 (298)	2085 (236)	1466 (166)				
	RB16 + RP6	57,600 (6508)	13	15	21	25	32	45	11	13	18	22	28	39	1246 (141)	1080 (122)	771 (87)	648 (73)	512 (58)	360 (41)		
RB16 + RP6 + RP5	57,600 (6508)	55	63	88	105	133	189	46	53	75	89	113	160									

	MODEL	Torque Rating In-Lbs/(Nm)	Gear Ratio					Mechanical Advantage +/- 10%					Input Torque In-Lbs/(Nm)									
			1					1					2393 (270) <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>									
MOTORIZED	RM3	2,154 (243)	1					1					2778 (314)	2083 (235)								
	RB9	7,500 (847)	3	4				3	4				1403 (159)	1052 (119)	935 (106)	701 (79)						
	RB9 + SPUR	7,500 (847)	7	9	10	13		5	7	8	11		1101 (124)	955 (108)	682 (77)	573 (65)	452 (51)	318 (36)				
	RB9 + RP5	7,500 (847)	8	9	13	15	19	27	7	8	11	13	17	24	6250 (706)							
	RB12	22,500 (2542)	4					4					3157 (357)	2104 (238)								
	RB12 + SPUR	22,500 (2542)	9	13				7	11				2478 (280)	2148 (243)	1534 (173)	1289 (146)	1018 (115)	716 (81)				
	RB12 + RP5	22,500 (2542)	10	12	17	20	25	36	9	10	15	17	22	31	983 (111)	852 (96)	608 (69)	511 (58)	404 (46)	284 (32)		
	RB12 + RP6 + RP5	22,500 (2542)	27	31	44	52	66	94	23	26	37	44	56	79	10667 (1205)							
	RB16	48,000 (5424)	5					5					4229 (478)	3666 (414)	2618 (296)	2199 (249)	1737 (196)	1222 (138)				
	RB16 + RP6	48,000 (5424)	13	15	21	25	32	45	11	13	18	22	28	39	1038 (117)	900 (102)	643 (73)	540 (61)	426 (48)	300 (34)		
RB16 + RP6 + RP5	48,000 (5424)	55	63	88	105	133	189	46	53	75	89	113	160									

Useful Equations

$\#_{in} = \text{Input Turns to Operate } \frac{1}{4} \text{ Turn}$
 $D_{hw} = \text{Handwheel Diameter}$
 $MA = \text{Mechanical Advantage}$
 $N = \text{Gear Ratio}$
 $F_{rp} = \text{Rimpull}$
 $RPM = \text{Input RPM}$
 $T_{1/4} = \text{Time to Operate } \frac{1}{4} \text{ Turn (Sec)}$
 $T_{in} = \text{Input Torque}$
 $T_{out} = \text{Output Torque}$

Input turns to operate $\frac{1}{4}$ turn

$$\#_{in} = \frac{N}{4}$$

Time to operate $\frac{1}{4}$ turn (Seconds)

$$T_{1/4} = \frac{15 \times N}{RPM}$$

Mechanical Advantage

$$MA = \frac{T_{out}}{T_{in}}$$

Required Input Torque

$$T_{in} = \frac{T_{out}}{MA}$$

Required Rimpull

$$F_{rp} = \frac{2 \times T_{in}}{D_{hw}}$$

Required Handwheel Diameter

$$D_{hw} = \frac{2 \times T_{in}}{F_{rp}}$$

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

Other RB Configurations

RB Multiple Inputs

RB bevel gear with multiple inputs:

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



Inverted RB



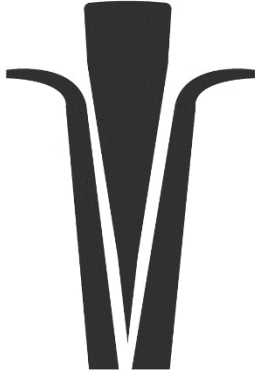
Inverted RB bevel or miter allows for reversed input vs output rotation.

RBP = RB + RP BASE

RB mounted to a higher torque capacity RP planetary gear or RSP spur gear. Increase output torque rating to 1,000,000 in-lbs [11,300 Nm]+



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.

