



**Brad Foote**<sup>®</sup>  
GEARING

A Broadwind Energy Company

PRECISION GEARING

GEARBOXES

REPAIR SERVICES

# Spiral Bevel Gears



**Brad Foote**<sup>®</sup>  
GEARING



BRAD FOOTE GEARING 90TH ANNIVERSARY



## A legacy of leadership.

For more than 90 years, Brad Foote Gearing has stood for excellence in precision gearing solutions. Customers in the oil, gas, mining, power generation and steel industries have trusted the long-lasting reliability of their gearing to us for generations.

And while we have the capacity to produce many gear types, it's our deep expertise with spiral bevel gears — from engineering to manufacturing — that sets us apart.



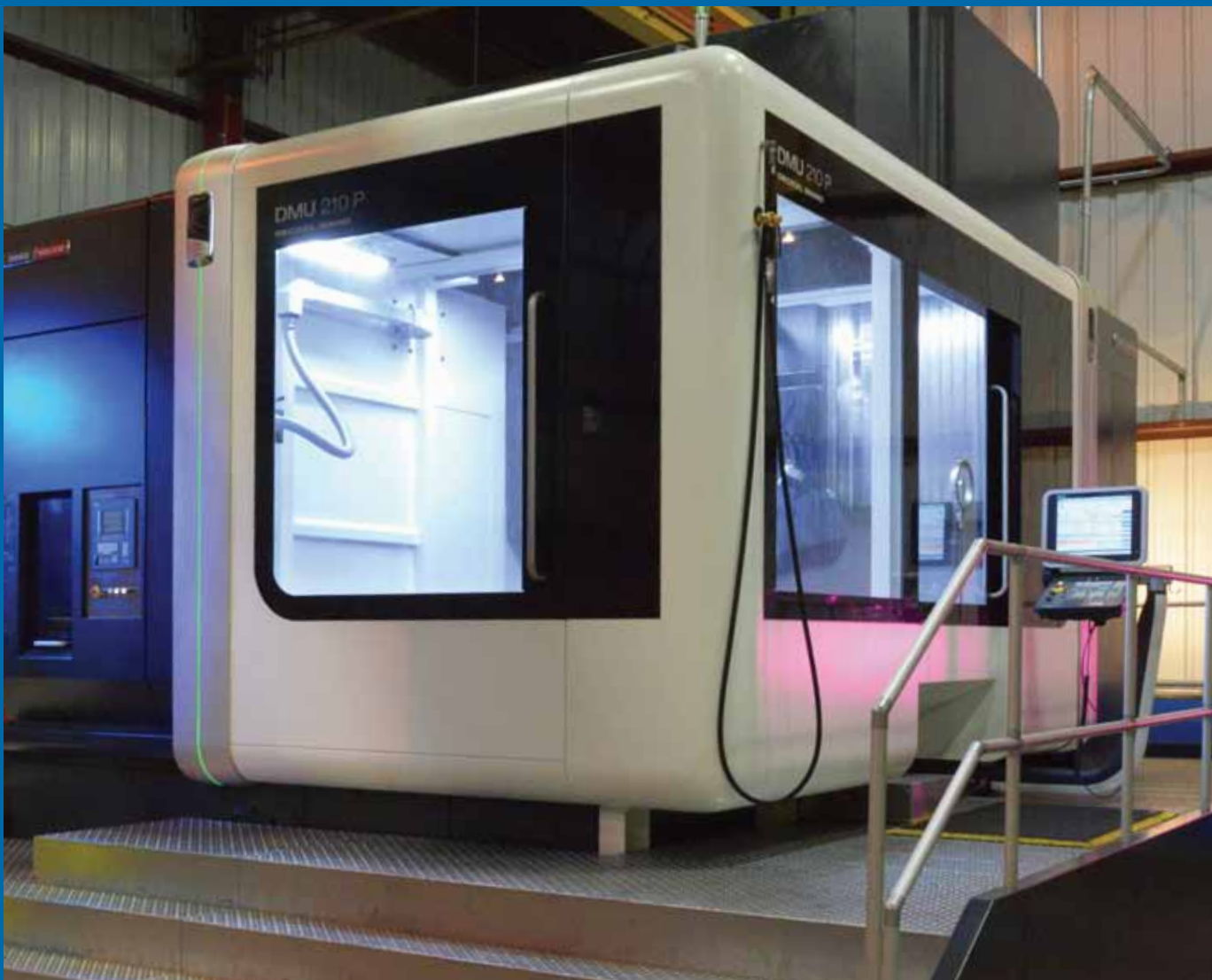
# Quality at every turn

Known for producing some of the finest and largest spiral bevel gears in the world, Brad Foote Gearing delivers an enhanced level of performance and strength. The exceptional quality of our precision gearing maximizes load-carrying capability with minimum vibration and lower noise levels — at extreme velocities.

## State-of-the-art manufacturing. World-class customer service.

Behind every precision gearing solution we create, there's a customer who values our support to help them do their job better. And that's why there's a robust team of engineers, service and support specialists behind every gear we make. From industry-savvy engineering expertise to customer service and follow-up, we're working to make sure everything we do runs smoothly for you.

DMU 210 P 5-Axis machine added in 2013





# Precision engineering on a larger scale

We are committed to maintaining our place as a global leader in gear production through continual investment in our manufacturing capabilities.

## Brad Foote's bevel machine capabilities include:

- Straight and skew toothed bevel gears to 100" diameter 2.88" whole depth (.75 DP full height, .65 DP stub)
- Curved tooth bevels to 100" diameter and .6 DP
- In-house straight, skew, and spiral bevel contour induction hardening
- Straight, skew, and spiral tooth gashing to reduce costs
- Tooth skiving of all bevel forms to provide qualities to AGMA 10-11.
- Inspection via Zeiss Gear Pro CMM

Our state-of-the-art 5-axis machine has the ability to cut both Gleason style and Klingelnberg style bevels. With the tight tolerances and cutting abilities of this new machine, we can now design, spec and produce large-scale gearing with a level of precision and speed previously unavailable.



▶ The Gleason 675 bevel gear generating machine produces spiral gears up to 100" in diameter.

## Spiral Bevel gears up to 100" in diameter

With two of the four Gleason 675 bevel gear generating machines in the world in our shop, we are particularly well suited to supply large spiral bevel gears. We can produce curved tooth spiral bevels to 100" diameter and .6 DP and can skive them after heat treatment. These machines are supplemented by two Gleason 655 curved tooth generators for smaller 30" to 50" diameter gears and several Gleason 16 and 26 spiral bevel generators are also available.

Our curved tooth spiral bevel induction hardener can significantly increase the power capacity over thru-hardened gearing without the distortion created by carburizing. This machine was developed by Brad Foote to pass an inductor through the entire tooth length to ensure the tooth is hardened in the critical root area to 50HRC min.

Our bevel cutting areas are supplemented by our world class manufacturing facility and grade 3 heat treat facilities.

**Smarter solutions for a broader range of markets and applications.** From loose gearing and gearboxes to heat-treating and industry-leading services, we are improving our ability to deliver the very best solutions for you, no matter what your business calls for. So your operation can run better and grow your competitive advantage.

### Bevel and Hypoid Gear Tolerances

Tolerances in Ten-thousandths of an Inch

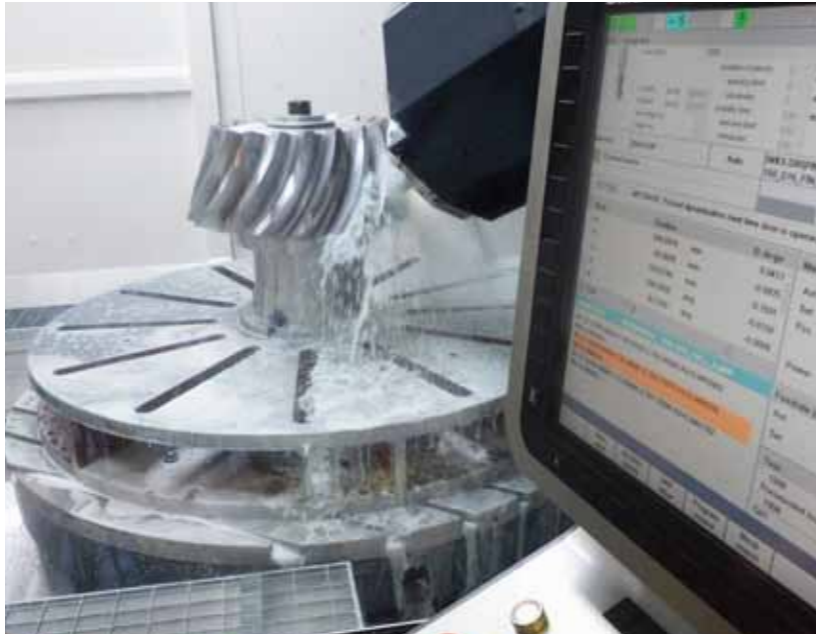
A.G.M.A. Quality Number	Diametral Pitch	Runout Tolerance				
		Pitch Diameter (in.)				
8		6	12	25	50	100
	5			160	200	255
	1		95	115	140	180
	2	58	68	82	100	125
	4	41	47	56	67	
	8	32	36	42		
9	5			113	140	180
	1		68	81	100	125
	2	40	48	58	70	88
	4	29	34	40	48	
	8	22	26	30		
10	5					
	1		50	58		
	2	30	34	40		
	4	21	24	28		
	8	16	18	21		
11	5					
	1		34	41		
	2	21	24	28		
	4	15	17	20		
	8	11	13	15		
12	5					
	1					
	2	15	18	21		
	4	11	12	14		
	8	8	9	11		

A.G.M.A. Quality Number	Diametral Pitch	Spacing Tolerance				
		Pitch Diameter (in.)				
8		6	12	25	50	100
	5			39	42	46.5
	1		24	27	28.5	33
	2	21	21	22.5	22.5	28.5
	4	16.5	18	19.5	22.5	
	8	15	16.5	18		
9	5			28.5	30	33
	1		16.5	18	21	24
	2	15	15	16.5	18	21
	4	12	13.5	14	16.5	
	8	11	12	13		
10	5					
	1		13	13.5		
	2	10.5	11	10.5		
	4	9	10	10.5		
	8	8	9	10		
11	5					
	1		9	9		
	2	7.5	7.5	9		
	4	6	7	7.5		
	8	6	6	7		
12	5					
	1					
	2	5	6	6		
	4	4.5	5	5		
	8	4.5	4.5	5		

## Experience across industries

Brad Foote is a leader in the design, development and production of gears for virtually every industry that requires right angle drives. Our reputation as producer of the finest spiral bevel gears has achieved industry recognition for:

- Oil field rotaries
- Coal pulverizers
- Rock crushers
- Paper pulpers
- Cement separators
- Machine tools
- Off-road equipment
- Cooling tower drivers
- Pump drives
- Steel mill roll drives
- Bow thrusters



## Bevel and Hypoid Gear Tolerances

Tolerances in Ten-thousandths of an Inch

A.G.M.A. Quality Number	Diametral Pitch	Pitch Tolerance				
		Pitch Diameter (in.)				
8		6	12	25	50	100
	5			26	28	31
	1		16	18	19	22
	2	14	14	15	17	19
	4	11	12	13	15	
	8	10	11	12		
9	5			19	20	22
	1		11	12	14	16
	2	10	10	11	12	14
	4	8	9	9.5	11	
	8	7.5	8	8.5		
10	5					
	1		8.5	9		
	2	7	7.5	8		
	4	6	6.5	7		
	8	5.5	6	6.5		
11	5					
	1		6	6		
	2	5	5	6		
	4	4	4.5	5		
	8	4	4	4.5		
12	5					
	1					
	2	3.5	4	4		
	4	3	3.5	3.5		
	8	3	3	3.5		

A.G.M.A. Quality Number	Diametral Pitch	Total Index Tolerance				
		Pitch Diameter (in.)				
8		6	12	25	50	100
	5			78	84	93
	1		48	54	57	66
	2	42	42	45	51	57
	4	33	36	39	45	
	8	30	33	36		
9	5			57	60	66
	1		33	36	42	48
	2	30	30	33	36	42
	4	24	27	28.5	33	
	8	22.5	24	25.5		
10	5					
	1		22.5	27		
	2	21	22.5	24		
	4	18	19.5	21		
	8	16.5	18	19.5		
11	5					
	1		18	18		
	2	15	15	18		
	4	12	13.5	15		
	8	12	12	13.5		
12	5					
	1					
	2	10.5	12	12		
	4	9	10.5	10.5		
	8	9	9	10.5		



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## About Brad Foote Gearing

Founded in 1924, Brad Foote Gearing, a Broadwind Energy, Inc. (NASDAQ: BWEN) company, delivers total precision gearing solutions to customers across a breadth of industries including mining, oil and gas, steel and wind. Brad Foote features state-of-the-art gear cutting, heat treating and testing capabilities. With a complete offering of spur, helical, double helical, bevel and spiral bevel precision gearing, catalog and custom gearbox upgrades and repair services, *Brad Foote Gearing is engineered to perform.*



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