DESIGN FOCUS: MAXIMIZE EFFICIENCY

Due to the trade-offs associated with key performance characteristics, gear types do not lend themselves to universal statements comparing one to another. If a comparison between two gear technologies is required, it must be made within the context of a specific application and focused on a specific performance characteristic.

In this case study, Helicon and Worm gear types are compared within the context of an application in which the primary objective is to *maximize efficiency*. The application's requirements are shown to the right.

APPLICATION REQUIREMENTS:

Maximum Available Space	3.7 in. x 3.7 in. x 1.0 in.	94 mm. x 94 mm. x 25.4 mm.
Minimum Torque	270 in-lb	30.5 Nm
Minimum Efficiency	70%	
Operating Speed	2,500 RPM	
Reduction Ratio	30:1	
Expected Life	1,000 hours	

RESULTS:

IMPERIAL	Maximum Efficiency (%)	
Helicon	84.2	
Worm*	82.6	
Advantage	Helicon 1.9%	

Resultant Torque (inlbs)		
315		
278		
Helicon 13.3%		

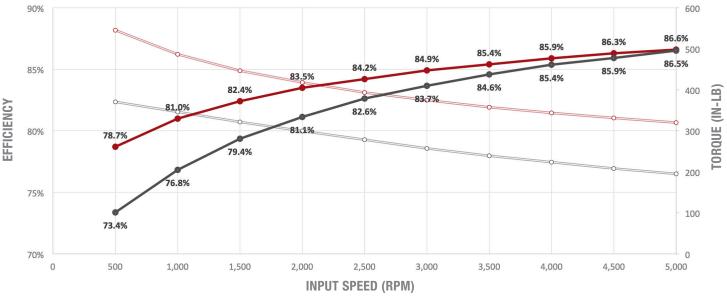
Resultant Space Claim (in.)	Resultant Space Claim (in.3)		
3.25 x 3.25 x 0.70	7.4		
3.36 x 2.90 x 0.67	6.6		
Worm 12.0%			

METRIC	Maximum Efficiency (%)	
Helicon	84.2	
Worm*	82.6	
Advantage	Helicon 1.9%	

Resultant Torque (Nm.)		
35.6		
31.4		
Helicon 13.3%		

Resultant Space Claim (mm.)	Resultant Space Claim (mm. ³)		
82.55 x 82.55 x 17.78	121.1		
93.85 x 73.66 x 24.69	108.2		
Worm 12.0%			

EFFICIENCY CURVES



Helicon EfficiencyWorm Efficiency

= Resultant Torque - Helicon

= Resultant Torque - Worm



^{*}Worm gearset design per ANSI/AGMA specification # 6034-B92