Training: Issue 4, Gear Quality

There are many companies that manufacture gears, but few have the capabilities to reach the high level of precision that PIC Design is known for. PIC's standard series of spur gears are held to AGMA 10 standards, with AGMA 12 and 14 levels available for applications where accuracy is paramount. In this issue we will look into the characteristics that determine a gear's quality level, how we measure them, and how those characteristics affect performance.

Quality Levels

- The American Gear Manufacturer's Association, or AGMA, specifies sets of tolerances for gear interaction that affect the accuracy and efficiency of the transmitted motion.
- PIC's standard gears are advertised as AGMA 10, but are typically closer to AGMA 12. If AGMA 12 or 14 is required, it can be specified at the end of the part number with a –Q12 or –Q14 respectively.
- To adhere to the higher quality levels, PIC tightens the tolerance on the bore, pitch diameter and outside diameter of the gear.

AGMA 390.03 FINE-PITCH GEAR TOLERANCES

PIC Quality Number	AGMA Quality Number	Number of Teeth and Pitch Diameter	Diametral Pitch Range	Tooth-to-Tooth Tolerance	Total Composite Tolerance
Standard	10	Up to 20 Teeth Incl.	20 to 200	.0007	.0010
		Up to 1.999"		.0005	.0010
		2" to 3.999"		.0005	.0012
		4" and over		.0005	.0014

How We Verify Quality Level

- PIC checks AGMA adherence by meshing the gear in question against a gear master of known accuracy, under slight pressure. The machine used is called a Gear Checker, and it produces a plot of the slight variances in center distance caused by the gear teeth engaging and disengaging as the gear rotates against the master.
- PIC calls these plots "True Blue Gear Tape" and can provide them to the customer for a charge.
- See below for an example of the True Blue Gear Tape and how the AGMA tolerances directly relate.