+1-330-847-7291
drakemfg.com

ACCURACY REPORT – WORM GEAR

ABSTRACT

With the support of our engineers and technicians, Drake Manufacturing developed a grinding process that averages Class 2 DIN Worm Gears. The piece was a single start worm gear with 0.4 mm radial grind stock and 45 mm of grind length. The total grind time averaged 1 minute and 48 seconds, which includes probe time and contour dress time.

MACHINE: Drake GS:TE240-360

PART: Worm Gear

DIN STANDARD: 3974 Accuracy of Worms and Worm Gears

INSPECTION MACHINE: Wenzel GearTec LH54 Gear CM

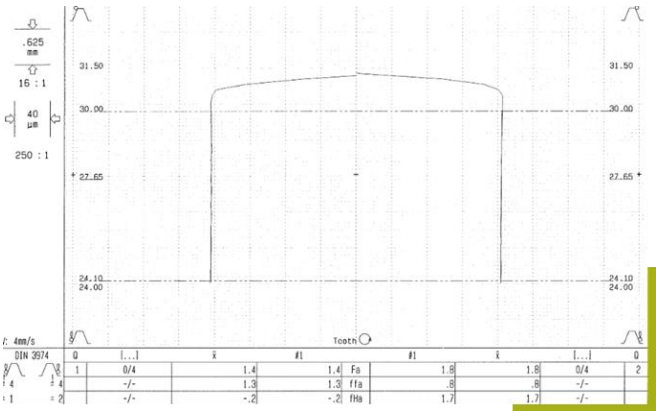
INPUTS

RADIAL PRE-CUT DEPTH	3.7 mm
RADIAL FORM HEIGHT	4.1 mm
# OF PIECES PER WHEEL	~6500
WHEEL TYPE	Ceramic Grain Vitrified Bond
THREAD LENGTH	45 mm
RADIAL GRIND DEPTH	0.4 mm

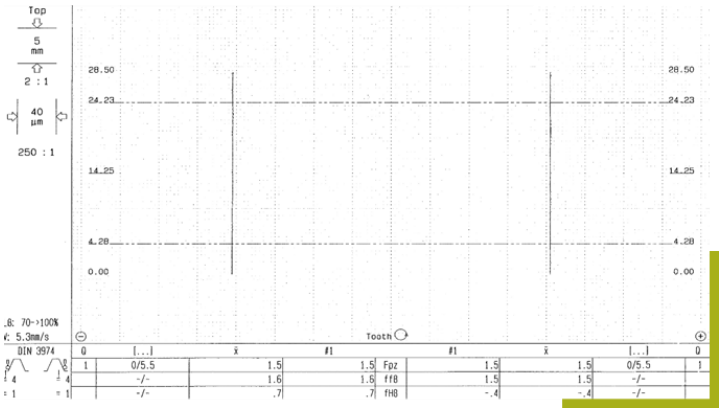
RESULTS

CYCLE TIME	1 minute 48 seconds	
SUPER FINISH	0.269 Ra	
PROFILE DEVIATION (LEADING)	1.4 microns	DIN Class 1
PROFILE DEVIATION (TRAILING)	1.8 microns	DIN Class 2
LEAD DEVIATION (LEADING)	1.5 microns	DIN Class 1
LEAD DEVIATION (TRAILING)	1.5 microns	DIN Class 1

PROFILE



LEAD



TESTING

A 30-piece sample was prepared using Drake's GS:TE240-360. The parts were manually loaded and ground between centers. To drive against the part's unique hex feature, the Drake team engineered a custom driver that would utilize the hex feature to pre-align the threads. Fine tune timing of the thread was achieved utilizing Drake's in-process thread probing.

A vitrified bond ceramic grain wheel was dressed using Drake's contour dressing solution. This method allows the end user to dress nearly any form into their wheel without relying on a formed dressing roll solution. Profiles are generated using the X and Z machine axes and surface finish can be controlled using wheel, work and roll speeds, roll direction, and dress feed rate user inputs. This method allows for highly precise and repeatable forms.

Inspection of the gears was completed using a Wenzel GearTec gear checker. The worms were checked against DIN standard 3974.

DETAILS

Drake Thread Grinders

The external thread grinder is typically used when grinding taps, gages, multi-start worms, ball screws, electronic steering components, thread rolls, rotor components and more. True machine performance is determined by accuracy during motion. The accuracy during movement is the real key to lead accuracy. Drake machines are designed by a talented team of engineers with several decades of experience.

Drake uses cutting-edge technology to build machine tools that minimize lead errors. The use of linear and torque motors virtually eliminates mechanical backlash. The machine used in this case was a Drake GS:TE240-360 External Thread Grinder.

PARTSMART™ MENU-DRIVEN SCREENS
Simplifies setup and ensures accuracy. The operator simply enters part-specific values into the control and the software does the rest.

AUTOMATION
Drake offers a variety of automation options unique to your specific application. With Drake automation solutions, you will deliver consistent, high-quality results

LINEAR MOTORS
Machine is built with linear motors and linear roller ways for maximum acceleration and contouring.

CAST-POLYMER BASE
Machine is built on a cast polymer base for vibration damping and thermal stability. Compact, high-mass base allows for high accelerations for minimizing cycle time.

MACHINE SPECIFICATIONS

	GS:TE240-360	GS:TE400-360	GS:TE400-750
Length between centers (0° helix)	360 mm	360 mm	750 mm
Maximum swing ø over table	240 mm	400 mm	400 mm
Lead	Various	Various	Various
Lead angle	Various	Various	Various
Wheel spindle power	12 kw / 16 kw	12 kw / 16 kw	12 kw / 16 kw
Wheel spindle speed	8,000 rpm	8,000 rpm	8,000 rpm
Standard grinding wheel range:			
Outside diameter	≤400 mm	≤400 mm	≤400 mm
Width	10 to 25 mm, optional ≤ 60 mm	10 to 25 mm, optional ≤ 60 mm	10 to 25 mm, optional ≤ 60 mm
Bore	160 mm	160 mm	160 mm
Workhead speed	Up to 300 rpm continuous	Up to 300 rpm continuous	Up to 300 rpm continuous
Workhead spindle nose	A2-6	A2-8	A2-8
Rapid return speed	Up to 40 m/min	Up to 40 m/min	Up to 40 m/min
Number of CNC axes	4	4	4

Discover Drake

Drake Manufacturing is a full service, turnkey manufacturer of precision CNC machines and provider of engineered solutions. Founded in 1972, Drake is headquartered in Warren, Ohio. The premium Drake brand is known around the world for innovation and process expertise throughout the thread grinding industry.