

Equipment and Facilities List

GEAR SHAPING

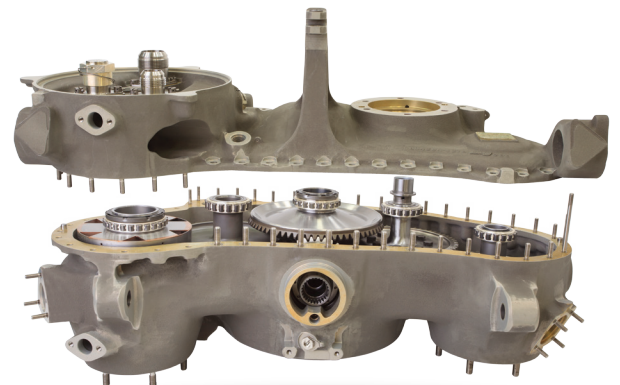
- (1) Fellows 20-8 6-axis CNC shaper, 20" maximum pitch diameter, 23" vertical clearance, 8" stroke, with tailstock
- (1) Fellows 20-4 shaper, 20" maximum pitch diameter, 23" vertical clearance, 4" stroke
- (2) Fellows 10-4 4-axis CNC shaper, 10" maximum pitch diameter, 10" vertical clearance, 4" stroke
- (1) Fellows 10-4 shaper, 10" maximum pitch diameter, 10" vertical clearance, 4" stroke, with tailstock
- (3) Fellows 10-2 shaper, 10" maximum pitch diameter, 10" vertical clearance, 2" stroke, with tailstock
- (4) Fellows FS180 5-axis CNC shaper, 7' maximum pitch diameter, 10' vertical clearance, 1.25" stroke

GEAR HOBBING

- (1) Barber-Colman 16-36 multi-cycle hobber, 16" maximum pitch diameter, 36" length, with differential
- (1) Jeil JDP-2 hobber, 20" maximum pitch diameter
- (1) Mitsubishi GE15A CNC hobber, 7" maximum pitch diameter
- (1) Pfauter P320 CNC hobber, 12" maximum pitch diameter, 8" length, 3 DP maximum, for spur and helical gears and splines, with crowning and taper hobbing

BEVEL GEAR EQUIPMENT

- (2) Gleason Phoenix 400PG CNC hypoid gear grinder, work diameter to 16", for grinding hypoid or spiral bevel gears
- (2) Gleason Phoenix 200PG CNC hypoid gear grinder, work diameter to 12", for grinding hypoid or spiral bevel gears
- (1) Gleason Phoenix 250HC hypoid cutting machine, work diameter up to 18", for cutting hypoid or spiral bevel gears
- (1) Gleason Phoenix 275HC hypoid cutting machine, working diameter to 11", for cutting hypoid or spiral bevel gears
- (2) Gleason Phoenix 175HC hypoid cutting machine, work diameter up to 12", for cutting hypoid or spiral bevel gears
- (1) Gleason CB cutter building machine, a highly accurate computer controlled face cutter set-up and measuring fixture
- (1) Gleason #523 bevel gear tester
- (1) Gleason #14 bevel gear tester
- (7) Gleason #13 bevel gear tester
- (5) Gleason #6 bevel gear tester
- (1) Gleason #439 (#104) straight bevel generator
- (2) Gleason #429 (#14) straight bevel generator
- (2) Gleason #12 straight bevel generator
- (5) Gleason #15 blank checker, with digital readouts
- (1) Gleason #572 creep feed cutter sharpener
- (2) Gleason #12 cutter blade sharpener
- (1) Gleason #528 cutter truing device



GEAR GRINDING

- (1) Kapp VUG 432 CNC spur gear grinder, 9.8" maximum pitch diameter, work length to 27", equipped for both internal and external grinding, and cluster gear grinding, uses CBN grinding wheels, automatic synchronization
- (1) Kapp VAG 432 CNC spur gear grinder, 9.8" maximum pitch diameter, work length to 27", equipped for external grinding, and cluster gear grinding, uses CBN grinding wheels, automatic synchronization
- (3) Kapp VAS 432 CNC spur and helical gear grinder, 12" maximum pitch diameter, work length 25", uses CBN grinding wheels, automatic synchronization
- (1) Niles ZE 400S CNC spur and helical gear grinder, 16" maximum pitch diameter, work length 20", with automatic synchronization, and in-process lead and profile inspection, uses aluminum oxide and CBN grinding wheels for both internal and external grinding
- (1) Samputensili RI-370 CNC gear grinder, 15" maximum pitch diameter, 20' length, spur and helical grinding, with automatic synchronization, and in-process lead and profile inspection, uses aluminum oxide and CBN grinding wheels
- (3) Gear and spline lappers

HEAT TREATING

- **(1) Solar horizontal front loading vacuum carburizing furnace, model HVC-3836-2QIQ.**
Hot zone 24" x 24" x 36"; maximum operating temperature 2400°F, temperature uniformity $\pm 10^{\circ}\text{F}$
- **(1) Solar horizontal front loading vacuum carburizing furnace, model HFL-3872-1QIQ.**
Hot zone 24" x 24" x 72"; maximum operating temperature 2500°F, temperature uniformity $\pm 10^{\circ}\text{F}$
- (2) Lindberg box furnace, 24" X 24" X 36", controlled atmosphere, with recorder
- (2) Despatch oven, with recorder, to 500°F
- (1) Cincinnati Sub-Zero freezer model T-21-3-3-S/WC, chilling to -120°F
- (1) Harris freezer, 20 ft³ with recorder, to -80°
- (1) Lindberg endothermic gas generator, 1000 cubic feet per hour

INTEGRATED MILL TURN CENTER

- (1) DMG Mori Seiki NTX2000/1500 high precision mill/turn center, 24" maximum turning diameter, 60" turning length, 76 tool magazine
- (2) DMG Mori Seiki NTX4300/1500 high precision mill/turn center, 26" maximum turning diameter, 60" turning length, 240 tool magazine

TURNING

- (2) Mori Seiki NLX3000/70 turning center, 17" maximum turning diameter, 28" maximum turning length
- (2) Hitachi Seiki HT 23SIII Hitec-turn lathe, with quick change tooling, 2.5" bar feed
- (1) Hitachi Seiki HT 23J Hitec-turn lathe, with quick change tooling
- (2) Hitachi Seiki HT 25G Hitec-turn lathe, with quick change tooling
- (5) Okuma LC-30 4 axis (dual turret) CNC lathe
- (1) Okuma L470BB/650 turning center
- (2) Okuma LB3000EX turning center
- (1) Okuma LU400SB-25C/650 4-axis turning center
- (1) Trak 1845SX CNC lathe, shop-floor programming
- (1) Monarch 612 engine lathe, 16" x 30"
- (1) Monarch 10EE engine lathe, 12" x 20"
- (2) Takisawa engine lathe, 12" x 36"
- (2) Webb engine lathe, 17/25" x 40"

MILLING

- (2) Haas VF-3B 5-axis vertical mill, with rotary trunnion
- (1) Haas VF-3YT 5-axis vertical mill
- (1) Haas VF-2 4-axis vertical mill
- (2) Haas VF-2YT 4-axis vertical mill
- (2) Okuma MX-60HB 4-axis CNC horizontal machining center, OSP7000M control, 40" x 32" x 32" capacity, equipped with six 24" pallets and has a 150 tool capacity changer making it particularly suited for the production of complex gear cases



- (1) Okuma MC-V3016 CNC 4-axis vertical machining center, OSP7000 control, 36" x 18" x 18" capacity
- (2) Okuma MX-45VAE CNC 4-axis vertical machining center, OSP7000 control, 30" x 18" x 18" capacity
- (1) Trak K3 CNC knee mill, with shop-floor programming
- (1) Trak DPM3 bed mill, with shop-floor programming
- (12) Bridgeport vertical mill, digital read out

GRINDING

- (3) Studer S33 CNC ID/OD grinder, 13.5" maximum diameter, 40" length
- (1) Studer S33 CNC ID/OD grinder, 13.5" maximum diameter, 30" length, with **Ace part handling robot**
- (3) Okuma GI-20N CNC ID grinder, 10" ID, 18" swing
- (1) Okuma GI-20N CNC ID grinder, 2 spindle, 10" ID, 18" swing
- (1) Okuma GA-34N CNC OD grinder, 15" maximum diameter, (2) 22" and (1) 34" length, equipped with Marposs gaging
- (1) Okuma GU-34S CNC grinder, OD and ID spindles, 12" maximum diameter, 18" length, with in-process gaging
- (1) Arter D16 rotary surface grinder, 17" maximum diameter
- (1) Brown and Sharpe universal ID and OD grinder
- (2) Brown & Sharpe 618 MM Micromaster surface grinder, 6" x 18" magnetic
- (1) Brown & Sharpe 1224 MM surface grinder, 12" x 24" magnetic chuck
- (5) Crane Lapmaster 15" lapping machine
- (2) Excello 74 center lapper
- (1) Heald 273A ID grinder, 20" maximum diameter
- (1) Fisher ZSM-P-1250 center grinder
- (1) Moore G18 jig grinder, various grinding spindles, additional 6" rise
- (1) Norton CTU OD grinder, 6" x 18" capacity
- (1) Reid surface grinder, 6" x 12" magnetic chuck
- (1) Sunnen MBB1650 hone
- (3) Taft-Pierce rotary surface grinder, 6" maximum diameter
- (2) Technica center grinder

BROACHING

- (1) Lapointe V1 vertical broach, 5 ton, 42" stroke

INSPECTION EQUIPMENT

- (1) Brown & Sharpe Chameleon 7-6-5 coordinate measuring machine, 27.5" x 23.5" x 20" capacity with scanning capabilities
- (1) Brown & Sharpe Chameleon 7107C coordinate measuring machine, 31.5" x 63" x 27" capacity with auto probe changing and scanning capabilities
- (1) Brown & Sharpe Chameleon 9159 coordinate measuring machine, 41" x 82" x 35" capacity with scanning capabilities
- (1) Brown & Sharpe Reflex coordinate measuring machine, 16" x 20" x 16" capacity
- (1) Jenoptik Opticline C514 optical measuring system
- (1) Jenoptik Opticline C1023 optical measuring system
- (1) Fellows 4 fine pitch redliner, with recorder, composite checking, re-manufactured with up-grades
- (3) Fellows 12M involute checker, with recorder, measuring and recording involute profile, internal and external gears to 12" diameter
- (6) Fellows 12C cone checker, inspecting gear concentricity and tooth-to-tooth spacing
- (1) Gleason / M&M Sigma 5 gear analyzer, 475mm maximum outside diameter, 650mm between centers
- (1) Illitron 2276 gear charter, with recorder, composite checking, 24" maximum diameter, 28" length
- (6) Illitron 2280 gear charter, composite checking, 12" maximum diameter, 18" length
- (1) Mitutoyo SV-3100 profilometer
- (1) Mitutoyo SJ-201P surface roughness tester
- (4) Pratt & Whitney supermicrometer



- Gleason CAGE/GAGE and QUINDOS gear software tools for spur, helical, straight bevel, spiral bevel, and hypoid gear inspection and analysis options
- Johnson DF-2 thread gages with internal and external masters, 1.5"
- Optical flats, VanKeuren light sources

FULLY EQUIPPED GEARBOX ASSEMBLY AND TEST FACILITY

INCLUDES CLASS 10,000, ISO 7 CLEAN ROOM

OTHER EQUIPMENT

- (7) Aqueous part cleaning systems
- (2) Vapor de-greasers using n-propyl bromide based solvent
- (1) Black Diamond drill grinder
- (1) Blue M oven, 25" x 38" x 20", 650°
- (1) Caterpillar F35 fork truck
- (1) Clark ECS 25 fork truck
- (2) CMV abrasive blast unit
- (1) DoAll 16-3 vertical bandsaw, 16" throat
- (1) Fellows 6S helical cutter sharpener
- (1) Greive oven, 36" x 36" x 36", 350°
- (1) Grove SM2633BE man lift
- (1) Ingersoll EDM, 23" x 42" tank, equipped with ERM 120 amp power supply
- (1) JLG 20DVL man lift
- (1) Magna-flux magnetic particle inspection machine and Magna-flux demagnetizer
- (1) Mark V dot peen marking machine
- (1) Marvel Series 9 power hacksaw, 10" x 10' capacity
- (2) Pressure Blast vapor blast unit
- (1) Rosler R 320 rotary vibrator, 10 ft³ capacity
- (1) Roto-Finish vibratory finisher, 10 ft³ capacity
- (1) Schenck AB10/CAB70H dynamic balancer, horizontal, .16 to 16 gram inches, 2 to 130 lb part weight
- (1) Schenck VE3L/CAB700V dynamic balancer, vertical, .0008 to .8 gram inches, maximum 5.5 lb per plane
- (2) Shot peening Equipment
- (1) Sweco FMD-1LR finishing mill, 1 ft³ capacity
- (2) C&M Tooling vibratory deburring tub, 2 ft³

