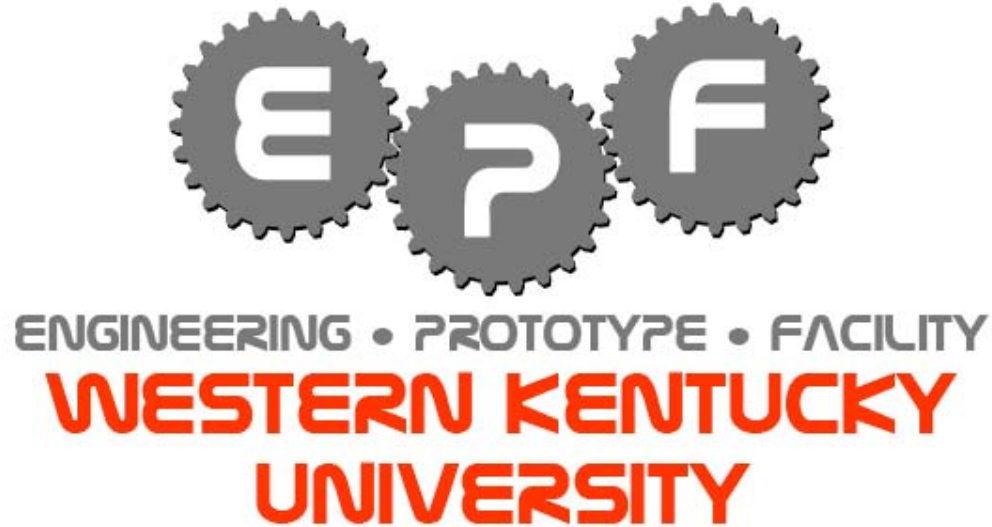


ENGINEERING PROTOTYPE FACILITY

www.wku.edu/epf



Engineering Prototype Facility Vision

The Engineering Prototype Facility provides Western Kentucky University with primary resource for engineering, prototyping and design services to meet customer needs locally, regionally, and globally. The facility recognizes and helps implement entrepreneurial and innovative customer needs, while maintaining a service-focused environment.

Engineering Prototype Facility Mission

The focus of the Engineering Prototype Facility is to offer a full service of engineering, prototyping and design services that provide the customer with quality engineering and prototyping services to allow a concept to be fully developed based on its intended form, fit, and function. The facility will also create an environment that promotes student, faculty, and staff engagement related to the prototyping process that are not contained in the engineering curriculum in order to stimulate the local, regional, and global economy and enhance the project based learning experience.

Prototyping Professionals

Director, Engineering Prototype Facility

H. Joel Lenoir, P.E., R.P.P.

Mechanical Systems Application Engineer

Chris Moore, EHS

Rapid Prototyping Capabilities

- 3D Printer (Fused Deposition Modeling) FDM

dimension
sst



The utilization of the Dimension SST 3D printer is the fast track to verifying form and functionality during product development. This machine works like an inkjet printer, laying down small single layers of plastic. With a printing envelope of 8in x 8in x 12 (W x D x H), a resolution of 0.010in and a support material that fills pockets and is then washed away, the rapid prototyping machine has the capabilities to produce even the most complex innovative products in a matter of hours or days.

Prototyping Equipment and Capabilities

Machine Capabilities

- Haas VF3 Vertical Milling Center with true 4 axis capabilities
- Haas SL 20 Turning Center with hydraulic tail stock
- CNC Plasma Cutter (2D)
- CNC Router (2.5D)
- Precision welding table (2D)
- Mig, Tig, and Arc Welding



VF-3

TRAVELS	S.A.E.	Metric
Maximum X Axis	40 "	1016 mm
Maximum Y Axis	20 "	508 mm
Maximum Z Axis	25 "	635 mm
Spindle Nose to Table (~ min)	4 "	102 mm
Spindle Nose to Table (~ max)	29 "	737 mm
STANDARD TABLE	S.A.E.	Metric
Length	48 "	1219 mm
Width	18 "	457 mm
Max Weight on Table (evenly distributed)	3500 lb	1588 kg
T-Slot Center Distance	3.15 "	80.0 mm
T-Slot Width	0.625 "	15.88 mm
Number of T slots	5	
SPINDLE	S.A.E.	Metric
Taper Size	CT/40	CT/40
Spindle Max Speed	7500 rpm	7500 rpm
Drive System	Direct Speed Belt Drive	
Max Torque Standard	75 ft-lb @ 1400 rpm	102 Nm @ 1400 rpm
Spindle Motor Max. Rating	20 hp	14.9 kW
With Optional Gearbox	250 ft-lb @ 450 rpm	339 Nm @ 450 rpm
Bearing Lubrication	Air/Oil Injection	
Cooling	Liquid Cooled	
AXIS MOTORS	S.A.E.	Metric
Max Thrust Rating X	2550 lb	11343 N
Max Thrust Rating Y	2550 lb	11343 N
Max Thrust Rating Z	4200 lb	18683 N
FEEDRATES	S.A.E.	Metric
Rapids on X Axis	1000 in/min	25.4 m/min
Rapids on Y Axis	1000 in/min	25.4 m/min

Rapids on Z Axis	1000 in/min	25.4 m/min
Max Cutting	650 in/min	16.5 m/min
TOOL CHANGER	S.A.E.	Metric
Max Tool Diameter Std (full)	3.5 "	89 mm
Maximum Tool Weight	12 lb	5.4 kg
Capacity Standard	20	20
Changer Type Standard (optional)	Carousel (SMTC)	
Tool-to-Tool (avg)	4.2 sec	4.2 sec
Chip-to-Chip (avg)	4.5 sec	4.5 sec
ACCURACY (SINGLE AXIS)	S.A.E.	Metric
Positioning (\pm)	0.0002 "	0.005 mm
Repeatability	0.0001 "	0.003 mm
GENERAL	S.A.E.	Metric
Power Required (continuous)	14 kVA; 200-250 VAC @ 50A, 3-phase; 50-60 Hz	14 kVA; 200-250 VAC @ 50A, 3-phase; 50-60 Hz
Machine Weight	12500 lb	5670 kg
Air Required	4 scfm, 100 psi	113 L/min, 6.9 bar



<u>SL-20 – Lathe</u>		
SWING DIAMETER	S.A.E.	Metric
Over Cross Slide	9.5 "	241 mm
Over Front Apron	23.0 "	584 mm
CAPACITIES	S.A.E.	Metric
Between Centers	24.0 "	610 mm
Chuck Size	8.3 "	210 mm
Maximum Bar Capacity	2.0 "	51 mm
Maximum Cutting Diameter	10.3 "	262 mm

Maximum Cutting Length	20.0 "	508 mm
Max Cutting Length w/ Std Workholding	19.0 "	483 mm
BIG BORE OPTION - CAPACITY	S.A.E.	Metric
Chuck Size	10.0 "	254 mm
Maximum Bar Capacity	2.5 "	64 mm
Between Centers	24.0 "	610 mm
Max Cutting Diameter	10.3 "	262 mm
Max Cutting Length	20.0 "	508 mm
Max Cutting Length w/ Std Workholding	17.5 "	444 mm
SPINDLE	S.A.E.	Metric
Maximum Speed	4000 rpm	4000 rpm
Draw Tube Bore ø	2.06 "	52.3 mm
Spindle Nose	A2-6	A2-6
Spindle Bore ø	3.00 "	76.2 mm
Max Power Rating	20 hp	14.9 kW
Max Torque Standard	154 ft-lb @ 650 rpm	209 Nm @ 650 rpm
5,000 RPM/30-HP OPTION	S.A.E.	Metric
Torque	120 ft-lb @ 1400 rpm	163 Nm @ 1400 rpm
7,000 RPM/20-HP OPTION	S.A.E.	Metric
Torque	80 ft-lb @ 1400 rpm	108 Nm @ 1400 rpm
BIG BORE OPTION - SPINDLE	S.A.E.	Metric
Max Speed	3400 rpm	3400 rpm
Peak Horsepower	30 hp	22.4 kW
Torque	300 ft-lb @ 700 rpm	407 Nm @ 700 rpm
Spindle Nose	A2-6	A2-6
Spindle Bore ø	3.00 "	76.2 mm
Draw Tube Bore ø	2.56 "	65.0 mm
Power Requirement	28 kVA	28 kVA
TRAVELS & FEEDRATES	S.A.E.	Metric
X Axis	8.45 "	214.6 mm
Z Axis	20.00 "	508.0 mm
Max Thrust Rating X	2400 lb	10676 N
Max Thrust Rating Z	3700 lb	16458 N
Rapids	1200 in/min	30.5 m/min
WITH TAILSTOCK OPTION	S.A.E.	Metric
Travels	20 "	508 mm
Thrust (max)	1500 lb	6672 N
Thrust (min)	300 lb	1334 N
Taper	MT4	
TURRET	S.A.E.	Metric
Boring Bar Rear Clearance (from turret face)	4.37 "	111.0 mm
Number of Tools	10	
OD vs ID Tools	Any Combination	
Tool Size (OD turning)	1.00 "	25.4 mm
Index Time (one tool)	1 sec	1 sec
LIVE TOOLING	S.A.E.	Metric
Drive Max Power Rating	5 hp	3.7 kW
Drive Ratio	1:1	
Brake Clamp Force	1000 lb	4448 N
Brake Diameter	13.25 "	336.5 mm
Torque (peak std.)	132 in-lb	14.9 Nm
Torque (peak w/HT option)	195 in-lb	22.0 Nm
Speed	3000 rpm	3000 rpm

Tooling	Standard VDI 40	Standard VDI 40
ACCURACY	S.A.E.	Metric
Positioning (±)	0.0002 "	0.005 mm
Repeatability	0.0001 "	0.003 mm
GENERAL	S.A.E.	Metric
Power Required (continuous)	14 kVA; 200-250 VAC @ 50A, 3-phase 60 Hz	4 kVA; 200-250 VAC @ 50A, 3-phase 60 Hz
Machine Weight	9000 lb	4082 kg
Coolant Capacity	40 gal	151 L
Air Required	4 scfm, 100 psi	113 L/min, 6.9 bar