



ISO 9001:2000

RAPID PRODUCT DEVELOPMENT

Engineering service offered by AEG through Partnership with Suppliers

Premium components without the premium price

Rapid Product Development and Rapid Prototyping service

American Engineering Group (AEG) offer rapid product development service, a rapid and more cost-effective solution for manufacturing. Bringing new innovative engineering products to the global market quickly and cost-effectively is a major competitive advantage.

Rapid product development allows companies of all sizes to gain that strategic advantage and place products in the marketplace days, weeks, or months ahead of competitors. AEG Rapid product development service can also be used to streamline the manufacturing of existing products. The key to effective rapid product development is the effective application of rapid prototyping and manufacturing technologies. AEG high-speed, low-cost rapid prototyping service make rapid product development and manufacturing possible, allowing companies to bring products to market faster and at lower cost than the competition.

Applications:

Rapid Manufacturing

- Aerospace and aircraft components
- Sports and recreation products
- Medical and Healthcare
- Industrial products
- Automotive and rail components
- Military/defense prototypes

Rapid Prototypes

- Functional Proof of Concept Prototypes
- Design Evaluation Models (Form, Fit & Function)
- Product Performance & Testing
- Engineering Design Verification
- Prototype Test Models

Tooling and Patterns

- Rapid Tooling (concept development & bridge tools)
- Injection Mold Inserts
- Tooling and Manufacturing Estimating Visual Aid
- Investment Casting Patterns
- Jigs and Fixtures
- Foundry Patterns - Sand Casting

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 Akron, Ohio 44311
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AEG specialty - Bringing speed to the manufacturing

- **Stereolithography (SLA):** One of the fastest and most economical methods of producing a part to emulate a plastic molded part. ABS, Polypro and clear polymer materials.
- **Selective Laser Sintering (SLS):** A fine nylon and a glass-filled nylon type material, geared towards parts that need to withstand more stress, such as living hinges, snap features and durable parts.
- **Fused Deposition Modeling (FDM):** The FDM is a very strong ABS-like material that flows through an applicator and is built up one layer at a time.
- **3D Modeling/Printing:** Parts are built from a wax and/or starch product. This is good for cheap design verification. The parts are not as strong as those produced through other methods.
- **CNC High-speed Machining/Wire EDM:** The CNC process is great for tight tolerance projects.

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Rapid Product Development: Aluminum to Titanium to Zinc

- **Metal Parts:** Castings in aluminum, titanium, steel, iron and zinc. A proprietary method similar to lost wax. Excellent for high detail and low volume parts in a very short time and for testing parts prior to die casting. Size ranges from 0.5 inch to 2 feet. Turnaround time: 2-10 days.
- **Investment Casting:** Good for high volume, small parts needing big detail. Uses the lost wax method from a cut tool and a ceramic shell. Offers a great surface finish with less porosity – vast material selection. Turnaround time: less than 8 weeks.
- **Rapid Sand Casting:** A very fast method for producing 1- 40 parts without the conventional parting – board or match plate. Tooling is built from a rapid prototype pattern, coupled with a follow board. Parts range from 3 inches to 3 feet. Turnaround time: less than 2 weeks.
- **Sand Casting:** Good for 100-500 parts from a few inches to a few feet. Either a match plate or parting board is used depending on volume and part design. Turnaround time: less than 4 weeks.
- **True –Cast:** This casting method is excellent for picking up great part detail and surface finish similar to die casting. Done from a RP pattern with a plaster /ceramic type tooling. Size can range from a few inches to a few feet. Good for 5-50 parts. Turnaround time: less than 5 weeks.
- **Vacuum Casting:** Great for 500 casting projects. A pattern is covered with a thin layer of plastic, backed with sand and another layer of plastic, put under a vacuum and then metal is introduced to produce the part. Turnaround time: less than 7 weeks.
- **High-speed CNC Machining/Wire EDM:** For both low and high volume parts machined from solid stock – recommended for tight tolerance projects. CNC machining is also used for the secondary operations for parts after they have been cast. Part size can vary. Turnaround time: less than 2 weeks.
- **Bent Metals and Stampings:** Perfect for chassis, housings, levers and other such parts. The process is done by break presses, laser cutting, welding and machining. Parts up to 60 inches. Turnaround time: less than 1 week.

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AEG advantage - Product Engineering Services from Concept to Production

- **Design:** 3D designs in Pro-E. 2D to 3D conversion.
- **Finite Element Analysis:** Stress analysis of the part – illustrates possible part design problem.
- **Mold Flow Analysis:** Computer analysis that shows injection mold flow prior to molding – illustrates possible problem areas of injection port.
- **Vacuum Impregnation:** The impregnation fills the porosity areas. For casting that will be subjected to pressure.
- **Secondary Machining Operations:** Many cast parts; metal or plastic, require secondary machining for tight tolerance areas.
- **Quality Control:** Parts, tools and data all will 100% inspected and proven accurate prior to and after being molded.
- **Reverse Engineering:** Parts are scanned, giving point-cloud-data, which can be converted into IGS files for 3D drawing development.
- **Pre-Production Approval Process (PAPP):** Specification development, Product testing and pre-production part approval.

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SOFTWARE EXPERTISE

CAD

- Catia
- Unigraphics
- Solidworks
- ProE
- I-Deas
- AutoCAD

CAE

- MSC.Nastran
- ANSYS
- MSC.ADAMS
- OptiStruct
- MSC.Patran
- LS-Dyna
- Hypermesh
- ABAQUS
- MSC.Dytran
- MSC.Marc
- Ansa
- SYSNOISE
- MSC.Fatigue

Simulations

- MSC.Superform
- MSC.Superforge
- Hyperform
- Moldflow

PDM

- Team Center
- Enovia
- Smarteam
- Windchill

Digital Manufacturing

- Delmia (ENVISION, IGRIP, QUEST, VIRTUAL NC)

CFD

- STAR-CD
- FLUENT
- CFX

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PROCESS DESCRIPTION	TURNAROUND TIME	PART SIZE	TOLERANCES	MATERIAL	QTY
SLA Parts	5 Days	20" X 20" X 23"	.002-.005 "	Photopolymer/ ABS	1-5 1-10
SLS Parts	5 Days	20" X 20" X 23"	.003-.005 "	Polycarbonate/ GF Nylon	1-20 1-10
FDM Parts	5 Days	10" Dia.	0.005 "	ABS/PC	1-10
3D Model Parts	1 Day	6" X 8" X 4"	.002 "	Wax	1-10
Ren-Board Parts	2 weeks	Unlimited	0.005 "	Urethane/Renboard	1-10
CNC Parts from Plastic	1 week	30" X 60" X 24"	0.005 "	Delrin/Nylon/ABS	1-10
CNC Parts from Metal	1 week	30" X 60" X 24"	0.005 "	Most Metal Alloys	1-10

PROCESS DESCRIPTION	TURNAROUND TIME	PART SIZE	TOLERANCES	MATERIAL	QTY
Rubber Molds	7-10 Days	Unlimited	.005-.010 "	Polyurethane	5-30
Amber Tool	4 weeks	4 feet	.005-.010 "	Polyurethane	30-100
Fiber Tool	4 weeks	4 feet	.005-.010 "	Polyurethane	100
Spin Cast	4 Weeks	10 inches	.010-.030 "	Polyurethane	20-100
Composite Tool	5 Weeks	10 inches	.005-.010 "	Thermoplastics	50
K-Tooling	5 weeks	up to 24 inches	.005-.010 "	Thermoplastics	100-500
RIM Tooling	6 Weeks	6 feet	.010-.030 "	Polyurethane	50-200
Mast Cast Tools	8 Weeks	12 inches	.005-.010 "	Thermoplastics	100-300
Cast Aluminum Tools	5 Weeks	24 inches	.010-.020 "	Thermoplastics	100-1000
Cut Aluminum Tools	6 Weeks	Small to Large	0.005 "	Thermoplastics	10-50k
Cut Hard Steel Tools	8 Weeks	Small to Large	0.005 "	Thermoplastics	100k
Vacuum Formed Tools	4 Weeks	6 feet	.010-.040 "	Various	10-500
Fiberglass Molds	4 Weeks	Very large	.010-.040 "	Fiberglass	100-500
Roto/Blow Prototypes	4 Weeks	48 inches	.010 "	Urethane	100
Cast & Cut Blow Mold	8 Weeks	3 feet	.015-.040 "	Various/HDPE	10-50k

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Metal	10 Days	inches to 3 feet	.010 "	Alum/Zinc/Steel/Iron	1-20
Sand	5 Days	8-12 inches	.010 "	Aluminum/Zinc	1-5
RP Sand	3 Weeks	up to 3 feet	.010 "	Aluminum/Zinc	1-25
True Cast	6 Weeks	3 feet	.010 "	Aluminum/Zinc	50-250
Precision Sand Casting	4 Weeks	Small to Large	.015-.040 "	Most Alloys	10-1000
Spin Casting	4 Weeks	2-10 inches	.010-.030 "	Aluminum/Zinc	50-200
Investment Cast	10 Weeks	up to 2 feet	.010-.030 "	Aluminum & Steels	1-Prod.
Vacuum Process	10 Weeks	up to 2 feet	.010 & .002 "	Aluminum	500-5000
Permanent Mold	14 Weeks	2 feet	.010-.040 "	Most Alloys	10-1000
Prototype Die-cast	6 Weeks	12 inches	.010"	Aluminum/Zinc	1-100
Metals & Stamping	1 Week	up to 60 inches	0.005 "	Alum/CRS/Stainless	1-50

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