EOS in Brief

e-Manufacturing Solutions
About EOS

Founded in 1989 and headquartered in Germany, EOS is the technology and market leader for design-driven integrated e-Manufacturing solutions for Additive Manufacturing (AM).

As an industrial manufacturing process it allows the fast and flexible production of high-end parts based on 3D CAD data at a repeatable industry level of quality. The disruptive technology paves the way for a paradigm shift in product design and manufacturing. It accelerates product development, offers freedom of design, optimizes part structures, and enables lattice structures as well as functional integration. As such, it creates significant competitive advantages for its customers.

In collaboration with its partners, EOS provides customers with complete end-to-end Additive Manufacturing solutions – from part design through to data generation, part production and post-processing.
EOS Solution Portfolio

EOS offers solutions to meet complex challenges in Additive Manufacturing that are geared towards specific industries and customers. The solution portfolio is modular in structure: its elements are perfectly harmonised and can be combined according to needs.

In addition to laser sintering systems, the EOS solution portfolio comprises a wide range of materials, software and processes as well as extensive services and supplementary products.
EOS Technology

**Additive Manufacturing**
Additive Manufacturing enables the production of components directly from 3D CAD data. Components are formed layer by layer from materials supplied as fine powder. A wide range of metals and polymers are available for use.

**How laser sintering works**
Laser sintering is a generative layering technique and the key Additive Manufacturing technology: first the laser sintering device applies a thin layer of the powder material to the building platform. A powerful laser beam then melts the powder precisely as defined by the computer-generated part design data. The production platform is then lowered and further powder material is added. The material is melted once again, bonding with the layer below at predefined points.

**For all industries**
Companies in the most varied sectors of industry are using Additive Manufacturing for rapid prototyping and production. These include aerospace, medical, automotive, special-machinery, tooling and lifestyle.
Benefits of Additive Manufacturing Using EOS Technology

**Maximum freedom of design**
The strengths of Additive Manufacturing come into effect where conventional manufacturing reaches its limits: where part design and production have to be reconceived so as to come up with effective solutions. It offers maximum freedom of design, enabling a process in which design determines production. Parts can be created which were difficult or even impossible to produce using conventional manufacturing techniques.

**Complex parts for functional optimisation**
Additive Manufacturing enables the production of highly complex geometries which are, at the same time, extremely lightweight and stable. It allows functional optimisation and integration so that additional assembly stages are no longer required. It is also ideal for producing small batch sizes at a reasonable unit price, as well allowing for a high level of product customisation – even in serial production.

**For all phases of the product lifecycle**
Additive Manufacturing is an ideal method for making prototypes during the early development phases of a product, significantly reducing the time to market. EOS also advises customers on series production, supporting them in finding the right applications, optimising these for Additive Manufacturing and putting this innovative technology to work for customers' core business.

1) 3D geometry model
2) Application of a layer of powdered material
3) Powdered material is solidified into a cross-section of the model
4) Building platform is lowered
5) The next layer of powder is applied
6) The process of application, melting and lowering repeats itself until the part is complete
7) Loose powder is removed
8) Completed part
Plastic laser sintering technology
Systems for the manufacture of series products, spare parts, prototypes and patterns for investment or vacuum casting.

**FORMIGA P 110**
This compact-class system offers a flexible, cost-efficient and highly productive entry into the world of laser sintering.

*System building volume:*
200 × 250 × 330 mm (7.9 x 9.8 x 13 in)

**EOS P 396**
The successor to the EOSINT P 395 offers higher productivity and therefore lower costs per building job. Improved hardware and software ensure greater consistency in part properties.

*System building volume:*
340 × 340 × 600 mm (13.4 x 13.4 x 23.6 in)

**EOSINT P 760**
The double-laser system offers new dimensions in terms of productivity and part size.

*System building volume:*
700 × 380 × 580 mm (27.6 x 15 x 22.9 in)

**EOSINT P 800**
The first laser-sintering system for processing high performance polymers at temperatures of up to 385°C.

*System building volume:*
700 × 380 × 560 mm (27.6 x 15 x 22.05 in)
Direct Metal Laser Sintering (DMLS)
Systems for the manufacture of tool inserts, prototypes and end products.

EOS M 400

Due to its large building volume, the system is capable of manufacturing high-quality metal parts on an industrial scale. The 1 kW laser ensures high DMLS building rates. The EOS M 400 features an intuitive graphic user interface along with extensive monitoring functions for quality assurance.

**System building volume:** 400 x 400 x 400 mm (15.8 x 15.8 x 15.8 in)

EOSINT M 280

The market-leading DMLS system, available with either a 200 W or 400 W laser.

**System building volume:** 250 x 250 x 325 mm (9.8 x 9.8 x 12.8 in)

EOS M 290

The latest generation of the DMLS system with enhanced quality management, extensive monitoring and optimized process gas management.

**System building volume:** 250 x 250 x 325 mm (9.8 x 9.8 x 12.8 in)
Examples of EOS Technology Applications

**Aerospace**
Fuel injector and swirler in EOS CobaltChrome MP1: reduction of production costs and weight by means of functionally integrated design. (Source: Morris)

**Automotive**
Knuckle made of EOS Aluminium AlSi10Mg: weight reduction of 660 g, increased rigidity. (Source: Rennteam Uni Stuttgart)

**Medical/Dental**
Dental bridge made of EOS CobaltChrome SP2: reduction of cost per part, high quality maintained. (Source: EOS)

**Lifestyle Products**
3D puzzle prototype production in PA 2200: functional and physical model precision with 54 individual parts. (Source: Marusenko)

**Tooling**
Tool inserts made of EOS MaragingSteel MS1 for lipstick lids: reduced cycle time due to conformal cooling. (Source: BKL)

**Industry**
Bronchial gripper with functional base plate made of PA 2200 black: 86% weight reduction, production costs reduced by 50%. (Source: Kuhn-Stoff/ Wittmann)
EOS Materials and Processes

EOS Materials
EOS offers a comprehensive portfolio of materials for use in a wide range of different industries and applications. We provide detailed advice and support for you in your choice of materials based on the property profiles your parts require. As part of our sustainability activities we also are preparing to offer our customers a polymer powder recycling program.

EOS Polymer Materials
- Polyamide (PA)
- Polystyrene (PS)
- Thermoplastic elastomer (TPE)
- Polyaryletherketone (PAEK)

EOS Metal Materials
- Stainless steel
- Aluminium
- Cobalt-chrome
- Nickel alloy
- Titanium

EOS Processes
EOS provides processes which are perfectly matched to the materials and systems: the EOS ParameterSets are the key to cost-efficient Additive Manufacturing of high-quality parts with standardised property profiles. The ParameterEditor allows you to adapt the parameters to meet your individual requirements.

EOS ParameterSets for Polymers
- TopQuality (layer thickness 60 µm)
- Performance (100 µm)
- Balance (120 µm)
- Speed (150 µm)
- TopSpeed (180 µm)

EOS ParameterSets for Metal
- Surface (layer thickness 20 µm)
- Performance (30-40 µm)
- Speed (30-60 µm)
EOS Software

Well-established EOS software products facilitate the processing of CAD data prior to production, supporting both the Additive Manufacturing process and quality assurance along the entire manufacturing chain.

**Positioning: Magics RP by Materialise**
- Software with integrated STL editor to process CAD data for Additive Manufacturing
- Problematic areas can be corrected and additional data inserted, Boolean operations and cuts can be carried out
- Duplication and positioning of parts, definition of production-free zones

**Slicing: Materialise Magics Build Processor or EOS RP Tools**
- Processing of CAD data in STL or CLI format for the building process
- For simple handling, EOS supplies its RP tools with the parameter file `<default.par>` which contains several sets of standard parameters

**Additive Manufacturing: EOS Process Software**
- The EOS Process Software (PSW) merges data into a single job, allowing complete control of the manufacturing process

**Quality Assurance: EOSTATE**
- Multifunctional tool for monitoring laser sintering systems: status, control and reporting software
- Able to monitor production on several interlinked systems at once, providing webcam view and data back-up
EOS Services

With its broad range of services, EOS provides competent help and support in all areas of Additive Manufacturing. Our customers benefit from efficient manufacturing processes, optimised product quality and increased protection of investments.

EOS has a global reputation for quality, reliability and security: we maintain regional service centers in Europe, North America and Asia/Pacific that employ highly qualified service personnel. A growing number of local service sites, stocked with spare parts, further offer close customer proximity.

Our EOS Service Organization consists of five interconnected areas, enabling customers to benefit from integrated solutions.

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  • Maintenance
  • Repairs
  • Spare parts logistics
  • System upgrades
  • Software updates
  • Relocation of systems | • Trainings for operation of all EOS Systems
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  • At customer location | • Building of sample parts
  • Feasibility studies
  • Application consulting
  • Customer-specific development | • Factory Acceptance Tests
  • Installation Qualification
  • Support for Operational Qualification | • Leasing and rental models for EOS systems
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