Basic training FORMIGA P 110

EOS GmbH
Organisational points

Course of the training
- There will be regular breaks
- A lunch break is planned
- The material learnt will be implemented in two practical building tasks in the evening

Objectives of the basic training
- Safe usage of the machine
- Preparation of building data for the building process
- Necessary basic knowledge for successful building using standard settings

Not an objective of the basic training
- Advanced knowledge of the building process
- Detailed knowledge for particularly unusual applications
- These topics could be addressed in more advanced training courses

Requirements for the basic training
- Knowledge of data preparation in Magics
Safety

**Basic hazards**
- Hot surfaces
- Heavy loads
- Moving parts

**Safety concept**
- Safety circuit
- Emergency stop circuit

**What is required for the work on the machine**
- Safety clothing
  - Safety shoes
  - Protective gloves
  - Face mask
  - Safety glasses
Video of sintering process
Laser sintering process

Recoat
Warm up
3
4
Laser sintering process

1. Recoat
2. Warm up
3. Expose
4.

Diagram showing the laser sintering process steps.
Laser sintering process
Part Property Management

Overview

- Normally designers plan the material- & process properties during design.
- EOS offers these standardized properties as Part Property Profiles (PPP).

Advantages:
- Standardization
- Dependability and quality
- Cost efficiency

Part Property Profiles

Standardized parts
Part Property Management

Parameter sets

**Original EOS Parameter sets**
- parameter sets released by EOS

**PPP Parameter sets**

**Customer parameter sets**
- parameter sets developed by customer.

**Part Property Profiles** specify material & process properties
- Parameter sets realize them.

**Original EOS Parameter sets (OEP)** = parameter sets released by EOS

**Part Property Profile Parameter sets** = qualified material- & process properties

**Customer parameter sets** = parameter sets developed by customer.
Parameter sets

Parameter sets contain:

- Material X parameter set 1
- Material X parameter set 2
- Material X parameter set 3
- Material X parameter set 4
- Material Y parameter set 1

PPP parameter set qualified properties

Original eos parameter set official parameters

Parameter sets contain process parameters and exposure types

material- & process properties
PPP parameter sets

Usage

Suitable PPP parameter sets are available for different part property profiles.

<table>
<thead>
<tr>
<th></th>
<th>TopSpeed ¹</th>
<th>Speed ¹</th>
<th>Balance</th>
<th>Performance</th>
<th>TopQuality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity</td>
<td>★★★★★</td>
<td>★★★★</td>
<td>★★★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td>Mechanical properties</td>
<td>★</td>
<td>★★★</td>
<td>★★★★</td>
<td>★★★★★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Surface / detail resolution</td>
<td>★</td>
<td>★★★</td>
<td>★★★★</td>
<td>★★★★★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Accuracy to shape</td>
<td>★★★★★</td>
<td>★★★★</td>
<td>★★★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td>Process stability</td>
<td>★★★★★</td>
<td>★★★★</td>
<td>★★★</td>
<td>★</td>
<td>★</td>
</tr>
</tbody>
</table>

★ = acceptable    ...    ★★★★★★ = best possible

¹ Only available for EOSINT P 395 & P 760
Hardware modules

- Recoater blade  
  Blade geometry affects the recoating behavior. 
  Different blade modules for the PPP Parameter sets.
  
  - 2 curved recoater blades (2200-4502; 1213-0109)
  - Flat recoater blade (2200-4119)
# Hardware modules

## Usage

Depending on the *PPP* parameter set used, the following hardware modules are required or recommended by EOS to optimize the part quality.

<table>
<thead>
<tr>
<th>Balance</th>
<th>Recoater blade</th>
<th>Curved (2200-4502)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td></td>
<td>Curved (2200-4502)</td>
</tr>
<tr>
<td>TopQuality</td>
<td></td>
<td>Flat (2200-4119)</td>
</tr>
</tbody>
</table>
## Process sequence

<table>
<thead>
<tr>
<th>Data preparation</th>
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<th>Building</th>
<th>Taking machine out of operation</th>
<th>Recycling</th>
</tr>
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<tr>
<td>- CAD</td>
<td>- Fill the powder bins</td>
<td>- Select building task on the machine</td>
<td>- Leave machine to cool down</td>
<td>- Sieve used powder</td>
</tr>
<tr>
<td>- Magics</td>
<td>- Fit exchangeable frame</td>
<td>- Start building process</td>
<td>- Remove exchangeable frame from the machine</td>
<td>- Add new powder</td>
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<td>- Powder base</td>
<td>- Monitor building process</td>
<td>- Mix powder</td>
<td></td>
</tr>
<tr>
<td>- Desktop-PSW</td>
<td>- Warm up machine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Transfer building task to the machine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Setting up the machine
- Fill the powder bins
- Fit exchangeable frame
- Powder base
- Warm up machine

### Building
- Select building task on the machine
- Start building process
- Monitor building process

### Taking machine out of operation
- Leave machine to cool down
- Remove exchangeable frame from the machine
- Unpack parts

### Recycling
- Sieve used powder
- Add new powder
- Mix powder
Technical data on the machine

**Building area**
- Width: 200 mm
- Depth: 250 mm
- Height: 330 mm

**Standard layer thickness**
- 0.1 mm

**Laser**
- CO₂-Laser
- Nominal power: 30 W
- Wave length: 10.2 – 10.8 µm
Machine & accessories demonstration

1. Machine overview
2. Touch screen user interface
3. Unpacking station
4. Mixing station
## Process sequence

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### Data preparation
- CAD
- Magics
- EOS Build Processor, RP-Tools
- Desktop-PSW
- Transfer building task to the machine

### Setting up the machine
- Fill the powder bins
- Fit exchangeable frame
- Powder base
- Warm up machine

### Building
- Select building task on the machine
- Start building process
- Monitor building process

### Taking machine out of operation
- Leave machine to cool down
- Remove exchangeable frame from the machine
- Monitor building process

### Recycling
- Sieve used powder
- Add new powder
- Mix powder
Process sequence

Data preparation
- CAD
- Magics
- EOS Build Processor, RP-Tools
- Desktop-PSW
- Transfer building task to the machine

Setting up the machine
- Fill the powder bins
- Fit exchangeable frame
- Powder base
- Warm up machine

Building
- Select building task on the machine
- Start building process
- Monitor building process

Taking machine out of operation
- Leave machine to cool down
- Remove exchangeable frame from the machine
- Unpack parts

Recycling
- Sieve used powder
- Add new powder
- Mix powder
Data preparation

- CAD
- Positioning in Magics
- Slice using EOS Build Processor, EOS RP-Tools
- Building tasks
- Job preparation using the Desktop-PSW
Data preparation

- **CAD**
- **Positioning in Magics**
- **Slice using EOS Build Processor, EOS RP-Tools**
- **Building tasks**
- **Job preparation using the Desktop-PSW**
Magics demonstration

1. Overview
2. Load platform
3. Load parts
4. Orientation
5. Positioning
6. Export
Positioning in Magics

3D data in the STL format are required for the data preparation. The data are positioned and orientated in the building area with the aid of Magics.

- Avoid building pieces of parts without a connection to the rest of the part

- Large flat surfaces should be at the top

- Avoid perpendicular angles (70°-90°) to the building area
Data preparation

Positioning in Magics

Slice using EOS Build Processor, EOS RP-Tools

Job preparation using the Desktop-PSW

Building tasks

CAD
EOS Build Processor demonstration

1. Slice

2. Parameters
Data preparation

1. **CAD**
   - Positioning in Magics

2. **Job preparation using the Desktop-PSW**
   - Slice using EOS Build Processor, EOS RP-Tools
   - Building tasks
1. Load default job
2. Scaling
3. Load parts
4. Top layer
5. Exposure parameters
6. Save job
7. Export job
Data preparation exercise

1. Prepare a part for the building process. For this purpose use Magics, EOS RP-Tools.

2. Assemble a building task with the aid of the Desktop-PSW.

3. Export the building task to the machine and start the building process.
End of day 1
Review of day 1

1. How does the building process work?

2. What is the reference layer thickness for Formiga P 100?

3. Which steps are necessary to prepare the data?
Process Sequence

Data preparation
- CAD
- Magics
- EOS Build Processor, RP-Tools
- Desktop-PSW
- Transfer building task to the machine

Setting up the machine
- Fill the powder bins
- Fit exchangeable frame
- Powder base
- Warm up machine

Building
- Select building task on the machine
- Start building process
- Monitor building process

Taking machine out of operation
- Leave machine to cool down
- Remove exchangeable frame from the machine
- Unpack parts

Recycling
- Sieve used powder
- Add new powder
- Mix powder
Process Sequence

Datenaufbereitung | Setting up the machine | Building | Taking machine out of operation | Recycling

- CAD
- Magics
- EOS Build Processor, RP-Tools
- Desktop-PSW
- Transfer building task to the machine

- Fill the powder bins
- Fit exchangeable frame
- Powder base
- Warm up machine
- Select building task on the machine
- Start building process
- Monitor building process
- Leave machine to cool down
- Remove exchangeable frame from the machine
- Unpack parts
- Sieve used powder
- Add new powder
- Mix powder
Setting up the machine

1. Fit exchangeable frame
2. Fit powder bin
3. Apply powder base
4. Warm up machine
Process sequence

Data preparation
- CAD
- Magics
- EOS Build Processor, RP-Tools
- Desktop-PSW
- Transfer building task to the machine

Setting up machine
- Fill the powder bins
- Fit exchangeable frame
- Powder base
- Warm up machine

Building
- Select building task on the machine
- Start building process
- Monitor building process

Taking machine out of operation
- Leave machine to cool down
- Remove exchangeable frame from the machine
- Unpack parts

Recycling
- Sieve used powder
- Add new powder
- Mix powder
Process sequence

- CAD
- Magics
- EOS Build Processor, RP-Tools
- Desktop-PSW
- Bauauftrag auf die Maschine übertragen

Data preparation

- Fill the powder bins
- Fit exchangeable frame
- Powder base
- Warm up machine

Setting up the machine

- Select building task on the machine
- Start building process
- Monitor building process

Building

- Leave machine to cool down
- Remove exchangeable frame from the machine
- Unpack parts

Taking machine out of operation

- Sieve used powder
- Add new powder
- Mix powder

Recycling
Building

Select building task on the machine
Start building process
Monitor building process
End of building task
Interrupt or cancel building process
Rectify problem
Modify building task if necessary
Continue building process
Process sequence

Data preparation
- CAD
- Magics
- EOS Build Processor, RP-Tools
- Desktop-PSW
- Transfer building task to the machine

Setting up the machine
- Fill the powder bins
- Fit exchangeable frame
- Powder base
- Warm up machine

Building
- Select building task on the machine
- Start building process
- Monitor building process

Recycling
- Leave machine to cool down
- Remove exchangeable frame from the machine
- Unpack parts

Recycling
- Sieve used powder
- Add new powder
- Mix powder
Process sequence

Data preparation
- CAD
- Magics
- EOS Build Processor, RP-Tools
- Desktop-PSW
- Transfer building task to the machine

Setting up the machine
- Fill the powder bins
- Fit exchangeable frame
- Powder base
- Warm up machine

Building
- Select building task on the machine
- Start building process
- Monitor building process

Recycling
- Leave machine to cool down
- Remove exchangeable frame from the machine
- Unpack parts

Recycling
- Sieve used powder
- Add new powder
- Mix powder
Taking machine out of operation

- Leave machine to cool down
- Remove exchangeable frame
- Remove empty powder bins
- Unpack parts
Risk of injury and damage!

Only use plastic powder approved by EOS GmbH.

Risk of fire and explosion

The plastic powders used are flammable and can form an explosive mixture in combination with air.

Protective measures:

Keep sources of ignition away from the working area.

Avoid electrostatic charging

For all tasks related to the machine and the accessories, use only an explosion-proof industrial vacuum cleaner of type B1.

Avoid swirling up plastic powder

Follow the further instructions in the operating instructions
Risk of slipping!
Depending on the floor characteristics, spilt plastic powder can cause a significant risk of slipping.

Immediately remove spilt plastic powder using an explosion-proof industrial vacuum cleaner of type B1
Moisten the floor for cleaning.

Risk to health!
Skin and eye contact with plastic powder, as well as inhaling and swallowing it can be harmful for the health.

Follow the instructions in the safety data sheet.
Wear personal protective equipment.
Do not eat, drink or smoke when working.
Do not cause plastic powder to rise.
Keep plastic powder in closed bins.
Follow all instructions in the operating instructions and the safety data sheets.

**Personal protective equipment:**

- Face mask
- Safety glasses
- Protective gloves
- Safety shoes
Types of powder

Unfilled powder
- Pure polyamide powder (standard material)
- Good mechanical & thermal properties
- Used for functional parts of design quality

Filled powder
- Polyamide powder with filler material
- Filler material changes the appearance of the part and its mechanical & thermal properties
- Used for parts that can be subject to mechanical & thermal loads and modified appearance

Polystyrene powder
- Powder based on polystyrene
- Used for various casting processes (plastic casting, ceramic shell casting as well as vacuum casting)
- Powder can be re-used in full
Damage to the powder

- The powder is damaged by the high temperatures.
- It must be regenerated with new powder.
- Regeneration is not possible for all materials.
Powder states

- New powder from EOS GmbH
- Powder from the exchangeable frame that must be sieved and regenerated
- Sieved used powder for regeneration
- Regenerated powder (new powder & recycled powder) for the next building process
- Residues from the sieve or separated powder
Separating the powder during unpacking

- Only part of the used powder is needed for the recycling
- For optimal results, use smaller portions of damaged powder
- Separate used powder

Separation rules:

- **Immediately separate baked powder**
  Lumps of powder will result in process errors

- **Do not use powder adhering to parts**
  The powder adhering to parts is particularly heavily damaged by the exposure process

- **As a matter of preference use powder from the outside for recycling**
  Damage drops off from the inside to the outside of the exchangeable frame

- **As a matter of preference use powder from the upper layers**
  Damage drops off in Z direction from bottom to top
Problems when handling powder

**Electrostatic charging**

- Due to charging when sieving or mixing:
  - Powder forms lumps
  - Material is not transported in front of the recoater
  - Powder cannot be homogeneously mixed

**Storing**

- The powder must be stored for at least 24 hours after sieving or mixing.

- Atmospheric humidity
  The higher the atmospheric humidity, the better the powder discharges.
Problems when handling powder

**Incorrectly mixed filled powder**

- Due to excessively long mixing times or due to powder falling from an excessive height:
  - Light/dark stripes in the part
  - Varying shrinkage and density
  - Shrinkage behaviour not constant in same batch

- **Mixing times**
  The mixing times recommended by EOS should be observed.

- **Fall height**
  The maximum height the powder falls should not be more than 1 metre.
Building temperature

• Important process parameters

• Excessively low/excessively high building temperature is a problem for the building process

• Optimum building temperature -> optimum parts

**Excessively low building temperature:**

With an excessively low building temperature, the outer areas of a layer roll upward. This behavior is called curling. The building temperature should be increased in steps until the effect no longer occurs.

**Excessively high building temperature:**

With an excessively high building temperature, all the powder in the building area may melt in the worst case. Even before this situation is reached, blade soiling, recoating with stripes and the tearing out of parts will occur.
The building temperature should be decreased in steps until the effects no longer occur.
Storage of the powder

Storage conditions

- Constant temperature (recommended temperature: **20-25°C**)
- Constant atmospheric humidity (recommended atmospheric humidity: **ca. 50%**)
- Storage in closed powder bins
- After delivery, store for 24h in closed bins to dissipate electrostatic charging
**Process sequence**

1. **Data preparation**
   - CAD
   - Magics
   - EOS Build Processor, RP-Tools
   - Desktop-PSW
   - Transfer building task to the machine

2. **Setting up the machine**
   - Fill the powder bins
   - Fit exchangeable frame
   - Powder base
   - Warm up machine

3. **Building**
   - Select building task on the machine
   - Start building process
   - Monitor building process

4. **Recycling**
   - Leave machine to cool down
   - Remove exchangeable frame from the machine
   - Unpack parts

5. **Recycling**
   - Sieve used powder
   - Add new powder
   - Mix powder
Process sequence

Data preparation
- CAD
- Magics
- EOS Build Processor, RP-Tools
- Desktop-PSW
- Transfer building task to the machine

Setting up the machine
- Fill the powder bins
- Fit exchangeable frame
- Powder base
- Warm up machine

Building
- Select building task on the machine
- Start building process
- Monitor building process

Recycling
- Leave machine to cool down
- Remove exchangeable frame from the machine
- Mix powder

Recycling
- Sieve used powder
- Add new powder
- Mix powder
Regenerating powder

1. Determine total quantity of powder
2. Fill new powder feed with new powder
3. Sieve quantity of recycled powder into powder bin
4. Transport quantity of new powder to powder bin
5. Close powder bin and roll on mixing station
6. Mix powder

Important: Only fill powder bin 2/3 full!
Basic information on process

Exposure

During the exposure of a layer for a part, the laser beam moves over the surface of the bed of powder:

- Exposure of the part contour
- Hatching of the enclosed area of the layer

Outer contour (edge of part)

Contour line (center of the path of the laser beam for the exposure of the contour)

Hatch lines (center of the path of the laser beam for the exposure of the enclosed area of the layer)
Basic information on process

Beam offset

1. Diameter of the laser beam approx. 0.4 mm
2. Curing zone of the laser beam (material-specific)

The contour of the part increases in size by the radius of the curing zone of the laser beam.

With the entry of a beam offset the increase in the size of the contour can be compensated using the PSW.

Standard value for beam offset in the PSW (PA 2200): 0.25 mm

The laser beam moves along the part contour based on the part data:

→ Contour of the part increases in size by the radius of the laser beam and the curing zone.

Beam offset = 0 mm

Laser beam moves along part contour with beam offset:

→ Contour of the part is the same as the size of the part data.
Taking machine out of operation, setting up, warming up, recycling exercise

1. Remove the last job built and clean the machine.

2. Set up the machine.

3. Start the automatic warm up phase to prepare for the next building task.

4. Unpack the last job built and recycle the powder.
Shrinkage & distortion

Shrinkage

- Parts shrink as they cool
- Dimensional discrepancy is not constant in the entire building area
  - It is lower at the outside than the inside
  - It is larger at the bottom of the exchangeable frame than at the top
- With the aid of the linear Z scaling, dimensional discrepancy in the Z direction can be compensated better than in the X and Y direction

Distortion

- Parts bend and twist
  - Inhomogeneous cooling of the parts
  - Temperature differences during the building process
- Distortion is not constant in the entire building area
  - It is lower at the inside than the outside
  - It is larger at the bottom of the exchangeable frame than at the top
Shrinkage & distortion - rules

• **Scale parts**
  Scale the parts to compensate for the shrinkage that occurs

• **Same position**
  To achieve part accuracies (shrinkage) as reproducible as possible, the parts should be positioned in the same place in the building area.

• **Warm up machine properly**
  The better the machine is warmed up before the building process, the more homogeneous the shrinkage behavior and the lower the distortion
Shrinkage & distortion - rules

• Upper 2/3 of the job
  Parts critical in relation to distortion and shrinkage should not be positioned in the lower 1/3 of the job, as here increased shrinkage and distortion can occur due to the colder removal chamber.

• Position on a corner
  Parts critical in relation to distortion with long surfaces should be positioned as far as possible diagonally in the building area.

• Unpack at <60 °C
  The job should only be unpacked at a core temperature <60 °C.
  Rule of thumb: building time = cooling time

• Regenerate generously
  For parts critical in relation to distortion, generously regenerated powder should be used. The fresher the powder, the less distortion on the parts.

• Larger layer thicknesses
  Building with larger layer thicknesses is better for parts critical in relation to distortion
Building temperature

The determination of the building temperature is necessary in the following cases:

- At the start of a new powder circuit (start with new powder)
- In case of part problems (e.g. torn out parts)
- In case of material change
- In case of material batch change.

**Procedure:**

The optimum building temperature is determined by building test crosses or test parts with simultaneous adjustment of the temperature.
1. Prepare a part for the building process. For this purpose use Magics, EOS RP-Tools.

2. Assemble a building task with the aid of the Desktop-PSW.

3. Export the building task to the machine and start the building process.
End of day 2
Review of day 2

1. Which steps are necessary to take the machine out of operation and clean the machine?

2. Why must the used powder be regenerated?

3. How can shrinkage be compensated?

4. What is the effect of an excessively low building temperature?
Taking machine out of operation, setting up, recycling, shrinkage exercise

1. Remove the last job built and clean the machine.
2. Set up the machine.
3. Unpack the last job built and recycle the powder.
4. Measure the shrinkage parts and determine the machine-specific shrinkage in X, Y direction.
Troubleshooting, maintenance

**Maintenance**

<table>
<thead>
<tr>
<th>Task</th>
<th>Possible cause</th>
<th>Rectification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean process chamber</td>
<td>Safety circuit is open</td>
<td>Specify cause for the interruption of the safety circuit. See frame panel manual.</td>
</tr>
<tr>
<td>Clean internal chamber</td>
<td>Emergency door is open</td>
<td>Specify cause for the opening of the emergency door. See frame panel manual.</td>
</tr>
<tr>
<td>Check reservoir plate for blockage or powder, clean if necessary. See Cleaning reservoir plate.</td>
<td>Berm and reservoir plate is blocking the path</td>
<td>Remove berm and reservoir plate.</td>
</tr>
<tr>
<td>Check reservoir plate for blockage on the surface, turn or rotate if necessary. See Cleaning reservoir plate.</td>
<td>Berm and reservoir plate is blocking the path</td>
<td>Remove berm and reservoir plate.</td>
</tr>
<tr>
<td>Clean windows for the KMera lens. See Cleaning KMera lens.</td>
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<td>Remove berm and reservoir plate.</td>
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<td>Clean KMera lens. See Cleaning KMera lens.</td>
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<td>Remove berm and reservoir plate.</td>
</tr>
<tr>
<td>Check evacuation system using vacuum. See Cleaning evacuation system.</td>
<td>Berm and reservoir plate is blocking the path</td>
<td>Remove berm and reservoir plate.</td>
</tr>
<tr>
<td>Check the operating pressure at the pneumatic service unit. See Checking operating pressure.</td>
<td>Berm and reservoir plate is blocking the path</td>
<td>Remove berm and reservoir plate.</td>
</tr>
<tr>
<td>Check valve of evacuation in the fine filter, empty filter separator as necessary. See Cleaning evacuation system.</td>
<td>Berm and reservoir plate is blocking the path</td>
<td>Remove berm and reservoir plate.</td>
</tr>
<tr>
<td>Check fine filter, replace filter element for the fine filter if necessary. See Cleaning fine filter.</td>
<td>Berm and reservoir plate is blocking the path</td>
<td>Remove berm and reservoir plate.</td>
</tr>
<tr>
<td>Check filter valve indicators for the fine filter. Changing filter element for the fine filter. See Changing filter element.</td>
<td>Berm and reservoir plate is blocking the path</td>
<td>Remove berm and reservoir plate.</td>
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<tr>
<td>Replace process chamber door seals. See Replacing process chamber door seals.</td>
<td>Berm and reservoir plate is blocking the path</td>
<td>Remove berm and reservoir plate.</td>
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</table>
1. Overview
2. Manage building tasks
3. Set date/time
4. Make network settings
5. Manage users
PPP parameter sets

- **TopSpeed**
  - Properties:
    - ✓ Layer thickness = 180 µm
    - ✓ For large, thick-walled parts
    - ✓ For parts critical for distortion
    - ✓ For high part accuracies
    - ✓ For low-cost parts with average to high quality requirements

- **Speed**
  - Properties:
    - ✓ Layer thickness = 150 µm
    - ✓ For large to medium parts
    - ✓ For lower-cost parts
    - ✓ Surface quality and mechanical properties somewhat higher than for TopSpeed
PPP parameter sets

- Balance
  Properties:
  - ✓ Layer thickness = 120 µm
  - ✓ EOS standard parameters
  - ✓ Balanced part properties
  - ✓ Suitable for the widest spectrum of geometries, part sizes and requirements

- Performance
  Properties:
  - ✓ Layer thickness = 100 µm
  - ✓ Isotropic strength and stiffness in all three spatial directions
  - ✓ Fine resolution with simultaneous very high surface quality
  - ✓ For medium to small parts with high quality requirements
PPP parameter sets

• TopQuality

Properties:

- Layer thickness = 60 µm

- Suitable for small to medium-size parts with extremely fine and fragile geometries and the highest surface quality

- The height is limited to 300 mm.

You will find an overview of all material data in the Internet at:

http://eos.materialdatacenter.com/eo/de
Thank You!

EOS GmbH