LÜHR
Modell- und Formenbau GmbH
Lühr Modell- und Formenbau GmbH

History

Founded in 2008 as a successor to Hermann Luehr GmbH (est. 1919), Lühr Modell- und Formenbau GmbH are specialists in the area of model, mold and tool manufacturing. In addition to this core competence, our service offer includes design model construction and rapid prototyping.

Qualified advances and the extensive know-how of our long-standing employees make our company a reliable partner of the aviation, aeronautics and automobile industries.

With our 26,910 sq. ft. of production area and modern equipment we offer our clients a wide range of services from development and construction, assembly and measuring.

- Ill.: Founder Hermann Luehr in front of the first company headquarters in Altona, Hamburg
- Ill.: Employees of the model factory with foundry patterns
Services

Overview

Construction – CAD/CAM
- 3D-CAD construction – Catia V5
- Reverse engineering
- NC programming – Tebis 3.4
- Remote data transmission

Model Construction
- Master patterns
- Cubing models
- Data control models
- Prototyp construction
- Pattern equipment
- GRP/CFRP processing

Tool Manufacture
- Drawing dies
- Stamping tools
- Embossing tools
- Cutting tools
- Calibrating tools
- Clamping devices
- Gluing devices

Mold construction
- Press molds
- Foaming molds
- Vacuum-deep-drawing molds
- Laminating molds
- Stretch-drawing molds

Gauge Construction
- Testing gauges
- Measuring equipment
- Welding equipment
- Assembly jigs

Design Model Construction
- Rapid Prototyping
- Trade Fair construction
- 2D/3D engravings
- 3D scanning

Plastic Joining Technology
- Sonotrodes
- Welding guns
- Hand lever presses
- Entry of articles
- Measurement report
- Customer service
- Spare parts service
- Reconstructions/ expansion
- Laboratory/ tests for pilot and small batch production

Measuring Technology – CAQ
- Digitalization
- Measurement of free-form surfaces
- First sample test report
Construction & Programming
At our modern CAD/CAM workstations components are designed and prepared three-dimensionally for manufacture. Our construction department is linked to clients worldwide in order to access data online, process and further develop it and make it available again to our clients. CATIA V5 is the main system in our company.

- 3D-CAD construction
- Reverse engineering
- NC programming
- Remote data transmission

**Software**
- Catia V5
- Tebis V3.4 3D/2,5D

III.: Catia V5 construction of a cubing model
Construction & Programming
CAD/CAM-Systems

Contact - CAD:
Axel Fischer
Tel.:   + 49 (0) 40 85 33 11 18
Fax.:   + 49 (0) 40 85 33 11 52
Email:  a.fischer@luehr.de

Viktor Maul
Tel.:   + 49 (0) 40 85 33 11 47
Fax.:   + 49 (0) 40 85 33 11 52
Email:  v.maul@luehr.de

Contact - CAM:
Sven Setzermann
Tel.:   + 49 (0) 40 85 33 11 48
Fax.:   + 49 (0) 40 85 33 11 52
Email:  s.setzermann@luehr.de

Ill.: NC-cutting programming with Tebis 3.3
Model Construction
We manufacture all types of models and prototypes in various scales or full-scale for the aviation and automobile industries. We process metal, wood, cast resin, GRP, CFRP, as well as thermoplastics and thermosetting plastics.

- Cubing models
- Prototype construction
- Master patterns
- Functional models
- Illustrative models
- Pattern equipment
- GRP/CFRP processing
Model Construction

Overview

Contact:

Heiko Reising
Tel.: +49 (0) 40 85 33 11 50
Fax.: +49 (0) 40 85 33 11 20
Email: h.reising@luehr.de

Volker Rütten
Tel.: +49 (0) 40 85 33 11 45
Fax.: +49 (0) 40 85 33 11 20
Email: v.ruetten@luehr.de

Reiner Dillwald
Tel.: +49 (0) 40 85 33 11 53
Fax.: +49 (0) 40 85 33 11 52
Email: r.dillwald@luehr.de

• Ill.: Rear section – cubing model
• Ill.: EPS natural model for the aviation industry
• Ill.: Data control model in 5-axis cutting process
• Ill.: Front section – tram
Mold Construction, Tool Manufacturing & Gauge Construction
In the area of tool manufacturing, Lühr works on complex molds, devices and components for the automobile and aviation industry. Each component is precision-made with state-of-the-art manufacturing equipment. With up to 6-axis programmable CNC processing machines, dimensions of

\[
\begin{align*}
X &= 3.500 \\
Y &= 1.000 \\
Z &= 0.750
\end{align*}
\]

and up to 10 tons can be processed.

The use of high-speed cutting (HSC) reduces the processing time and increases quality. Reduced cutting force places less strain on material leaving their specific characteristics intact, thus attaining improved surface quality. In addition, large components can be cut from just one piece.
**Mold, Tool and Gauge Construction**

**Mold Construction**
- Press molds
- Foaming molds
- Vacuum-deep-drawing molds
- Laminating molds

**Tool Manufacturing**
- Drawing dies
- Stamping tools
- Embossing tools
- Cutting tools
- Calibration tools
- Clamping devices
- Gluing devices

**Gauge Construction**
- Control gauges
- Measuring equipment
- Welding equipment
- Assembly jigs

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*Ill.: Laminating mold*
*Ill.: Stretch-drawing mold for an aircraft body*
*Ill.: Control Gauge I - panel*
*Ill.: Rear foaming mold*
*Ill.: Gluing device for an aircraft wing flap*
*Ill.: Control Gauge I – panel with various simulation modules*
## Machinery

Model and Mold Construction

<table>
<thead>
<tr>
<th>Make/Model</th>
<th>Drive</th>
<th>Processing Range [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>X max</td>
</tr>
<tr>
<td>Hedelius BC 100 HSC</td>
<td>Heidenhain iTNC 530</td>
<td>3.500</td>
</tr>
<tr>
<td>Hedelius CF 100 HSC</td>
<td>Heidenhain TNC 430</td>
<td>3.500</td>
</tr>
<tr>
<td>Hedelius CB 70 HSC</td>
<td>Heidenhain TNC 430</td>
<td>1.200</td>
</tr>
<tr>
<td>Hedelius CB 70/40</td>
<td>Heidenhain TNC 430</td>
<td>2.100</td>
</tr>
<tr>
<td>Depomill 5 axes HSC</td>
<td>Heidenhain TNC 430 M</td>
<td>2.200</td>
</tr>
<tr>
<td>Seiger SLZ 500 E [lathe]</td>
<td>Heidenhain Manual +4110</td>
<td>1.000</td>
</tr>
<tr>
<td>Conventional milling</td>
<td></td>
<td>1.200</td>
</tr>
<tr>
<td>Conventional milling</td>
<td></td>
<td>900</td>
</tr>
<tr>
<td>Paso P20T [engraver]</td>
<td></td>
<td>600</td>
</tr>
</tbody>
</table>

### Contact:

Heiko Reising  
Tel.: + 49 (0) 40 85 33 11 50  
Fax.: + 49 (0) 40 85 33 11 20  
Email: [h.reising@luehr.de](mailto:h.reising@luehr.de)

Reiner Dillwald  
Tel.: + 49 (0) 40 85 33 11 53  
Fax.: + 49 (0) 40 85 33 11 52  
Email: [r.dillwald@luehr.de](mailto:r.dillwald@luehr.de)
Measuring Technology & Quality Assurance
Lühr Modell- und Formenbau is working according to DIN EN ISO 9001:2008 certification and fulfils therewith the most stringent requirements and quality standards in production and technique.

Published by the International Organization for Standardization the DIN EN ISO 9001:2008 specifies requirements for a quality management system where an organization

- demonstrates its ability to consistently provide product that meets customer and applicable statutory and regulatory requirements
- enhances customer satisfaction through the effective application of the system, including processes for continual improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements.

The certification is executed by accredited laboratories and is subjected to special regulations.
Measuring Technology & Quality Assurance

Measuring Room

- Digitalization
- Measurement of free-form surfaces
- First sample test reports

- Air-conditioned
- High safety standard
- Video surveillance
- Just-in-time measurements

• Ill.: Stretch-drawing mold on the Zeiss SMM-D-CNC measuring system
<table>
<thead>
<tr>
<th>Make/Model</th>
<th>Measuring Range (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stiefelmayer Duplex</td>
<td>X max: 6.000</td>
</tr>
<tr>
<td></td>
<td>Y max: 3.000</td>
</tr>
<tr>
<td></td>
<td>Z max: 1.950</td>
</tr>
<tr>
<td>Stiefelmayer</td>
<td>X max: 3.500</td>
</tr>
<tr>
<td></td>
<td>Y max: 1.000</td>
</tr>
<tr>
<td></td>
<td>Z max: 950</td>
</tr>
<tr>
<td>Faro portable measuring arm</td>
<td>Radius 1.100</td>
</tr>
</tbody>
</table>

**Contact:**

Thomas Jentzsch  
Tel.: +49 (0) 40 85 33 11 25  
Fax.: +49 (0) 40 85 33 11 20  
Email: t.jentzsch@luehr.de

Dirk Enig-Thierbach  
Tel.: +49 (0) 40 85 33 11 27  
Fax.: +49 (0) 40 85 33 11 20  
Email: d.enig@luehr.de
Design Model Construction &
Rapid Prototyping
Design Model Construction

Overview

- Ill.: Design model of a quadrocopter
- Ill.: Model of a tile presentation system
- Ill.: Design model of a food testing device
Stereolithography

Application

- Design prototypes
- Concept models
- Master patterns for sand and precision casting
- Master patterns for vacuum casting
- Mold manufacture thermoforming
- Small batch production
- Models for fit and function tests

+ Good surface (structures)
+ High dimensional stability
+ Transparent material
  [Inner construction visible]

Ill.: Application examples for stereolithography
Selective Laser Sintering

Application

- Design / concept models
- Master patterns for sand and precision casting & vacuum casting
- Mold manufacture thermoforming
- Models for fit and function tests
- Small batch production
- End products
- Orthoses

- Best material properties
- Wide material spectrum
- Good dimensional stability
- Series production/ end products

... Application examples for selective laser sintering
Fused Deposition Modeling

Application

- Glue gun principle
- Functional prototypes
- Prototypes with low surface demands
- Bulky, thick-walled components

+ good rigidity

III. Application examples for the fused disposition modeling process
3D Printing

Application

- Concept/design models
- Presentation models
- Architecture models
- Functional testing models
- Model for finite element analysis
- Molds for metal casting

+ very fast process
+ low-cost materials
+ color presentation

Application examples for 3D print
Design Model Construction

Additional Services

- 2D/3D engraving
- 3D scanning
- Individual promotional items in 3D
- Advertising displays and signs

Contact:
Timo Engelmann
Tel.: +49 (0) 40 85 33 11 17
Fax.: +49 (0) 40 85 33 11 33
Email: t.engelmann@luehr.de

III. Engraved titanium rings
Plastics Joining Technology/
Ultrasonic Welding
Digital Innovation

Ever greater demands are placed on the quality of welded, riveted or cut plastic. In order to satisfy these demands, we have developed a new generation of ultrasonic generators. Digitally controlling all the parameters affords the greatest precision and stability. Negative influences, such as temperature, component tolerances and aging are a thing of the past. An innovative control circuit reliably protects the semiconductor even in the event of a short circuit, thus preventing breakdowns. The removable LCD graphic display enables the separate installation of a control and power element.
### DSG Series

<table>
<thead>
<tr>
<th>Feature</th>
<th>440/840</th>
<th>1520/1522</th>
<th>2220/2222</th>
<th>4020/4022</th>
<th>1530</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage [volt] (AC 50/60 Hz)</td>
<td>230/110</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
</tr>
<tr>
<td>Current consumption [A] (max., effective)</td>
<td>6,0/12,0</td>
<td>10,0</td>
<td>12,0</td>
<td>20,0</td>
<td>10,0</td>
</tr>
<tr>
<td>Operating frequency [kHz]</td>
<td>40</td>
<td>20/22</td>
<td>20/22</td>
<td>20/22</td>
<td>30</td>
</tr>
<tr>
<td>Power output [watt] (max.)</td>
<td>400/800</td>
<td>1.500</td>
<td>2.400</td>
<td>4.000</td>
<td>1500</td>
</tr>
<tr>
<td>Amplitude consistency [%]</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>HF output voltage (Volt)</td>
<td>1.300</td>
<td>900</td>
<td>1.100</td>
<td>1.450</td>
<td>1.000</td>
</tr>
<tr>
<td>Dimensions (per module)</td>
<td>H: 173 mm B: 71 mm T: 420 mm</td>
<td>H: 173 mm B: 71 mm T: 420 mm</td>
<td>H: 173 mm B: 71 mm T: 420 mm</td>
<td>H: 173 mm B: 71 mm T: 420 mm</td>
<td>H: 173 mm B: 71 mm T: 420 mm</td>
</tr>
<tr>
<td>Weight [kg]</td>
<td>3,0</td>
<td>3,2</td>
<td>3,3</td>
<td>4,5</td>
<td>3,2</td>
</tr>
</tbody>
</table>

- Subject to modification of technical changes
Lühr ultrasonic converters transform the high frequency electrical energy produced by the generator into mechanical oscillation. All converters are equipped with carefully selected piezo-ceramic discs. This technology permits conversion with virtually no energy loss. The sturdy construction of the ultrasonic heads guarantees a high durability. The working frequencies are in the ultrasonic range above the audibility threshold.
- Sandwich type piezo-ceramic transducer
- Central mounting
- Fully encapsulated
- High strength
- Titanium end masses
- Brass casing
- Short design length
- Zero tolerance force transducer between head and press owing to mechanical zero point location
- Plug-in coaxial lead to generator
- Longer coaxial leads from generator to ultrasonic converter are possible
- 100 % duty cycle with air cooling

**Converter type USK**

<table>
<thead>
<tr>
<th></th>
<th>440</th>
<th>840</th>
<th>1530</th>
<th>1020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working frequency (kHz)</td>
<td>40</td>
<td>40</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Input power (Watt)</td>
<td>400</td>
<td>800</td>
<td>1.500</td>
<td>4.000</td>
</tr>
<tr>
<td>Dimensions (Ø x L)</td>
<td>Ø: 47.8 mm L: 69 mm</td>
<td>Ø: 47.8 mm L: 88 mm</td>
<td>Ø: 56 mm L: 122 mm</td>
<td>Ø: 89 mm L: 133 mm</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>0.66</td>
<td>0.54</td>
<td>1.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Suitable generators</td>
<td>DSG 440 ULC 440B</td>
<td>DSG 440</td>
<td>DSG 1530</td>
<td>DSG 1520 DSG 2220 DSG 4020</td>
</tr>
</tbody>
</table>

- Subject to modification of technical changes
The ergonomically perfected Lühr welding gun enables the fast joining of plastic injection molding or deep-drawn components with its ultrasonic welding process. The small design enables welding, even in hard-to-reach places. Flexible use, even for extremely diverse welding planes can be realized at low cost. The robust design has proven itself, even under extreme production conditions.
**Ultrasonic – Welding Gun**

**USH 40**

- Sturdy aluminum housing
- Ergonomic handle
- Modern design
- Small and handy design
- Quick sonotrode exchange
- Easy positioning, even with asymmetrical sonotrodes
- Flexible system cable
- Light-weight

<table>
<thead>
<tr>
<th><strong>Pistol Series</strong></th>
<th><strong>USH 40</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Available generator power output [watt, max.]</td>
<td>400/800</td>
</tr>
<tr>
<td>Operating frequency [kHz]</td>
<td>40</td>
</tr>
<tr>
<td>Joining time [Time switch option in the generator]</td>
<td>keying by hand</td>
</tr>
<tr>
<td>Length of connecting cable [m]*</td>
<td>3,0/5,0</td>
</tr>
<tr>
<td>Dimensions [ø x L x H in mm]</td>
<td>55 x 98 x 200</td>
</tr>
<tr>
<td>Weight [kg]</td>
<td>0,45</td>
</tr>
</tbody>
</table>

- Subject to modification of technical changes
- * longer cable upon request (max. 8.0m)
The round design of the Lühr USH 40i welding gun enables the fast joining of plastics, as well as cutting material by means of ultrasonic. The ergonomic design affords gentle and flexible use.
Ultrasonic – Welding Stick
USH 40i

• Sturdy aluminum housing
• Small and handy design
• Integrated transducer
• For welding and cutting
• Easy positioning due to the round design
• Flexible system cable
• Light-weight

Pistol Series

<table>
<thead>
<tr>
<th>Available generator power output (watt, max.)</th>
<th>USH 40i</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating frequency (kHz)</td>
<td>40</td>
</tr>
<tr>
<td>Joining time (Time switch option in the generator)</td>
<td>keying by hand</td>
</tr>
<tr>
<td>Length of connecting cable (m)*</td>
<td>3,0/5,0</td>
</tr>
<tr>
<td>Dimensions (ø x L x H in mm)</td>
<td>45 x 150</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>0,45</td>
</tr>
</tbody>
</table>

* Subject to modification of technical changes
* longer cable upon request (max. 8.0m)
One method of plastics joining technology is ultrasonic welding. For this purpose, we manufacture titanium, steel or aluminum sonotrodes for all frequency ranges using precise CNC processing. Each sonotrode is made to suit its individual welding task and optimized through rigorous testing in our laboratory.
Additional Services

Ultrasonic Welding

- Entry of articles/ measurement report
- Hand lever presses
- Customer service/service
- Spare parts service for all US components within 48 hours
- Reconstructions/ expansion of existing systems
- Laboratory/ tests for pilot and small batch production

Contact:

Bernd Hennings
Tel.: + 49 (0) 40 85 33 11 35
Fax.: + 49 (0) 40 85 33 11 29
Email: b.hennings@luehr.de

Jochen Hachmeyer
Tel.: + 49 (0) 40 85 33 11 19
Fax.: + 49 (0) 40 85 33 11 29
Email: j.hachmeyer@luehr.de

Ralph Kampeter
Tel.: + 49 (0) 40 85 33 11 42
Fax.: + 49 (0) 40 85 33 11 29
Email: r.kampeter@luehr.de
References

- Airbus
- AKsys
- Audi
- A. Kayser Automotive
- Autoliv
- Becker Marine Systems
- Bentley
- Bertrandt
- Birkby’s Plastic Limited
- Borgers
- BMW
- Collins & Aikman
- Comtas
- Daimler AG
- Decoma International
- Draeger
- Dynamit Nobel
- EADS
- Factor Design
- Faurecia
- Flamm Aerotec
- Ford
- Frimo Technology
- Grammer
- Hella
- Hydro
- IAC GmbH
- Intier Automotive
- Jaguar
- Johnson Controls
- Johnson & Johnson
- Junker & Partner
- Klefa Architekten
- Lear Corporation
- Leister
- Lufthansa Technik
- Magna
- MøllerTech
- M-Racing
- Opel
- Peguform
- PFW Aerotec AG
- Plastal
- Premium Aerotec
- Porsche
- Rehau
- Rieter
- Rover
- Saab
- Seat
- Seeber (Röchling Automotive)
- Skoda
- Stankiewicz
- Steinway & Sons
- Visteon
- Volvo
- VW
- Webasto
Lühr Modell- und Formenbau GmbH

Schützenwall 37-41 House D
22844 Norderstedt
Germany

T + 49 (0) 40 85 33 11 - 0
F + 49 (0) 40 85 33 11 - 33

E-Mail: info@luehr.de
Web: www.luehr.de

Management: Beate Lau, Hans-Joachim Kullick