



## FelssStart: Basic training for axial forming and rotary swaging

### Which are the advantages of axial forming and rotary swaging compared to other processes? What dimensions and tolerances can be achieved? And which components are suitable for this process at all?

The FelssStart training programme is aimed at buyers, planners, project managers, machine operators and managers without prior knowledge. Using examples, videos and pictures, it provides a theoretical introduction to the two cold forming processes axial forming and rotary swaging and imparts basic knowledge about the Tube+ process specially developed by Felss.

With FelssStart, both users and decision-makers learn the basics of the Felss cold forming processes and how they can be used to form and spline components.

Unit	Format	Language	Number of participants	Completion
1 unit of 90 minutes	Online training (Face-to-face seminar possible on request)	German or English	Groups up to 10 persons, individual bookings are possible.	Certificate of attendance without examination

### Training content

<p><b>Axial forming:</b></p> <ul style="list-style-type: none"> <li>• Design of an axial forming machine</li> <li>• Fields of application and advantages</li> <li>• Materials</li> <li>• Tolerances</li> </ul>	<p><b>Rotary swaging:</b></p> <ul style="list-style-type: none"> <li>• Construction of a rotary swaging machine</li> <li>• Fields of application and advantages</li> <li>• Materials</li> <li>• Tolerances</li> </ul>	<p><b>Tube<sup>+</sup>:</b></p> <ul style="list-style-type: none"> <li>• Basics</li> <li>• Structure of the tool</li> </ul>
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### Training documents

After the training you will receive a handout with a summary of the learning content.

### Registration & Participation

To register for the FelssStart online training, to find out more about the courses offered or current dates, and for individual booking enquiries, simply contact us by e-mail at [trainings@felss.com](mailto:trainings@felss.com).



## FelssPro: Intensive training for designers on axial forming and rotary swaging

**How can components be manufactured more precisely and economically using axial forming and rotary swaging? What are the requirements for the geometry and material of a component when using these processes? And how can they be designed?**

The FelssPro training programme is mainly aimed at technicians or engineers with design training, work planners and design-related employees with technical experience who are responsible for splines and shafts in the broadest sense. With a combination of intensive theoretical and practical learning

units, FelssPro deepens existing basic knowledge of the cold forming processes axial forming and rotary swaging. At the same time, the participants learn to implement these processes in their own designs using examples and to carry out the corresponding geometric calculations.

Unit	Format	Language	Number of participants	Completion
4 units of 90 minutes	Online training (face-to-face training available on request)	German or English	Up to approx. 10 participants (larger groups possible on request)	Certificate of participation with evaluation of success after training

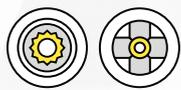
### Training content

#### Axial forming:

- Basics Axial Forming
- Frequency modulated axial forming
- Detailed development of achievable tolerances
- Requirements for the blanks
- Tip and root circle, roller dimension, radii, flank line deviations, surface quality
- Materials and their limits, exceptions, special case cast iron
- Cooling lubricants: requirements, approvals, viscosity
- Design information: Calculation of the minimum run-out, notes on the pre-diameter, run-in and run-out design, pull-in effect at the beginning of the spline, shape of the tip circle, volume constancy

#### Rotary swaging:

- Basics of rotary swaging
- Interaction of tools and axes, forces, limit load of the machine
- Feeding and grooving processes, combined processes, effects of combined processes
- Rotor shaft design example: introduction to stadium planning, difference to stadium operation
- Process limits
- Achievable tolerances and surfaces
- Requirements on raw material and blanks
- Cooling lubricants: task and design, approvals, viscosity
- Design information: Design of transitions, calculation of the expected increase in wall thickness.



## **FelssPro:** Intensive training for designers on axial forming and rotary swaging

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### **Training documents**

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Before the training begins, you will receive documentation with calculation programmes. A course book serves as a basis for work during the training. After completion of all learning units, a random success check is carried out to repeat what you have learned. In addition to a certificate of participation, you will also receive access to exclusive videos, a summary of the training, sample images and a sample stadium plan.

### **Registration & Participation**

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To register for a Felss online training, to find out more about the training courses offered or current dates, and for individual booking enquiries, please contact us by e-mail at [trainings@felss.com](mailto:trainings@felss.com).

### **Bookings & Enquiries**

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[trainings@felss.com](mailto:trainings@felss.com)

### **Your trainer**

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Peter Karch, Dipl. Ing. (FH) Mechanical Engineering  
Trainer for further vocational training  
10 years of professional experience in rotary swaging and axial forming