



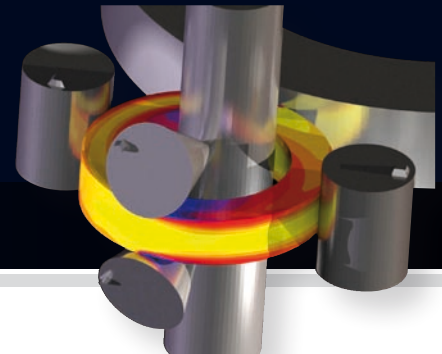
simufact.forming

Ring Rolling

Ring Rolling - an effective process in bulk metal forming

Seamless rings up to a diameter of 9 m are manufactured by ring rolling. These products are applied in bearings, bevels or final reduction gears. Typically, an upset and pierced ring is used as source product, which is then expanded on a ring rolling machine. Due to the reduction of the wall thickness (radially) and the ring height (axially) the ring diameter grows maintaining a constant ring volume.

by courtesy of



simufact.forming Ring Rolling

No. 1 in Ring Rolling Simulations

Simufact provides the most precise results due to realistic process representation. Leading machine manufacturers and many customers rely on Simufact simulation technology.

Take Advantage of the Benefits:

- Shorter development times
- Deeper process understanding
- Higher process stability & quality
- Prediction of component properties
- Higher machine uptime
- Substantially reduced development times
- Broadening of the product range
- Optimal coordination of the individual process steps
- Reduction of cracks and scrap

Reach your Optimisation Goals with Simufact.forming

- Avoid rolling defects
- Analyse the force and energy requirement
- Maintain the required temperature ranges
- Achieve constant ring diameter growth
- Adjust the concentricity
- Meet final geometry requirements
- Achieve microstructure requirements
- Determine the required rolling strategy



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Fields of Application

Materials and Grades

- Carbon steels
- Low and high alloyed steels
- Austenitic steels
- Super alloys like Inconel, Hastelloy, Waspaloy, Incoloy, Nimonic
- Non-ferrous metals like Titanium, Aluminium and copper alloys

Entire Process Chains

Simufact.forming models the entire manufacturing process chain of the ring manufacturing, starting with the initial heating, upsetting of pre-shapes, piercing, ring rolling, machining of the final geometry and the heat treatment.

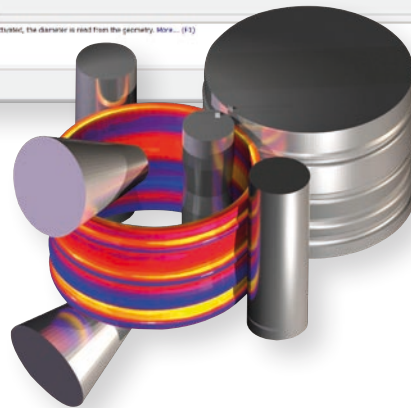
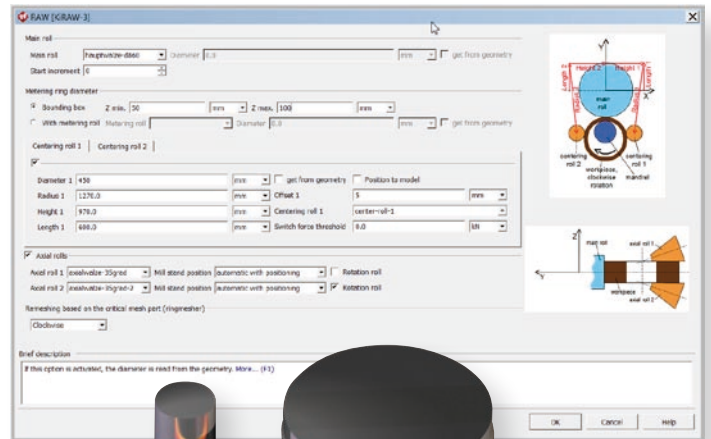
Wide Range of Ring Rolling Processes

No matter if ring rolling, ring expansion, axial-die rolling or wheel rolling, and regardless of whether it is hot or cold rolled or is a profiled or smoothed surface ring.: With Simufact.forming all ring rolling processes can be simulated in all dimensions and for all varieties of ring products.

Boundary Conditions for Ring Rolling

In order to provide you with a realistic representation of the ring rolling process, Simufact.forming is considering the typical boundary conditions of ring rolling:

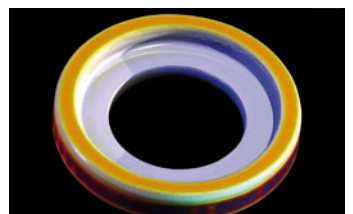
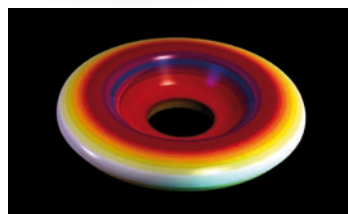
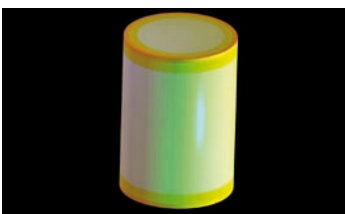
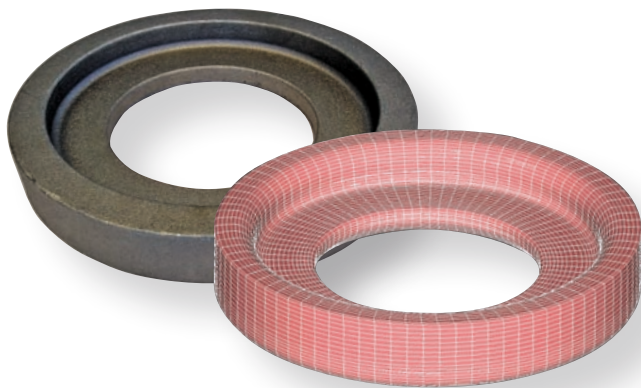
- Dragged rolls
- Centring rolls
- All rolls can be controlled as a function of process results (e.g. ring growth)
- Force and position control of the rolls
- Transversal ring displacement
- Open kinematics concept for individual customizing purpose



Our Simulation Know-how – Your Advantage

Tap into our years of expertise in the simulation of metal forming processes as well as the high technical and functional level of our software products:

- Consequent application of hexahedral elements provides more precise results
- Special mesh generation algorithms and strategies for ring rolling
- Through-process application of elasto-plastic as well as thermo-mechanical coupling in the material model
- This results in a highly accurate description of the stress-strain condition
- Models for the microstructure kinetic
- Simplest use due to templates and libraries providing close to production parameter definitions
- Precise modelling of the tribology by innovative friction models
- Realistic representation of the contact including of the slip in the rolling gap
- Realistic process modelling with „rigid-body-modes“ – allowing for the realistic workpiece movement
- The process model can be arbitrarily complex in respect to the number of tools / rolls, kinematic degrees of freedom and boundary conditions – still maintaining user-friendliness
- Representation of the complex kinematic control allows simulation progress depending on achieved process results
- Efficient switching between extremely fast computing axial symmetric 2D simulations or preforming processes to the 3D rolling operations
- Fast 3D simulations due to innovative Parallel Computing on Multi Core Workstations and Cluster Systems



Tell us your specific application; we will be happy to advise you.