

VM&P GmbH

Technical Consulting

Virtual Material & Process Development

VM&P GmbH

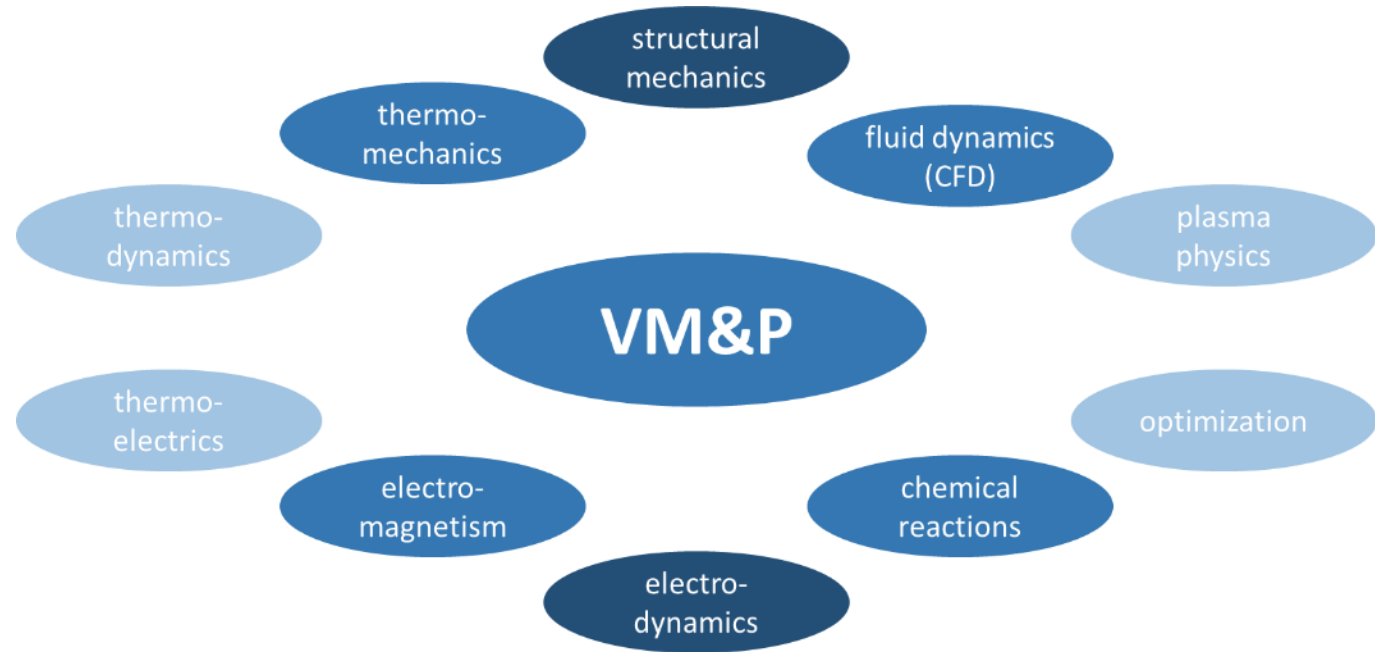
Your Expert Network for Technical Consulting

VM&P GmbH

- Technical concept assessment and development
- Technical design development
- Consulting in material selections
- Modelling & Simulation
- Process optimization

Industries

- Technical ceramics
- Refractories & furnace construction
- Automotive
- Carbon & Graphite
- Electric Machines



Virtual Material and Process Development



Our service

- Expertise in modelling, simulation, and computation
- Network with simulation experts and R&D labs
- Service for SMEs: support in filings for public funding

Modell:

- Virtual reality
- Simplified description of a technical or physical system
- Reduced in complexity
- Reduced in size
- Simplified boundary conditions

Simulation:

- Use of a modell to imitate a technical or physical process

Speed & Cost Efficiency

- Simulation of virtual prototypes instead of costly fabrication and testing of real parts
- Shorter development time & shorter time to market

Product Quality & Safety

- Identification and analysis of hazardous operating conditions
- Avoidance of subsequent cost by in-time identification of product risks

Innovation

- Design of innovative products by simulation
- Virtual testing in pre-development

Our Experience in Ceramics and Refractories

Process Modelling, Application Modelling, and Optimization

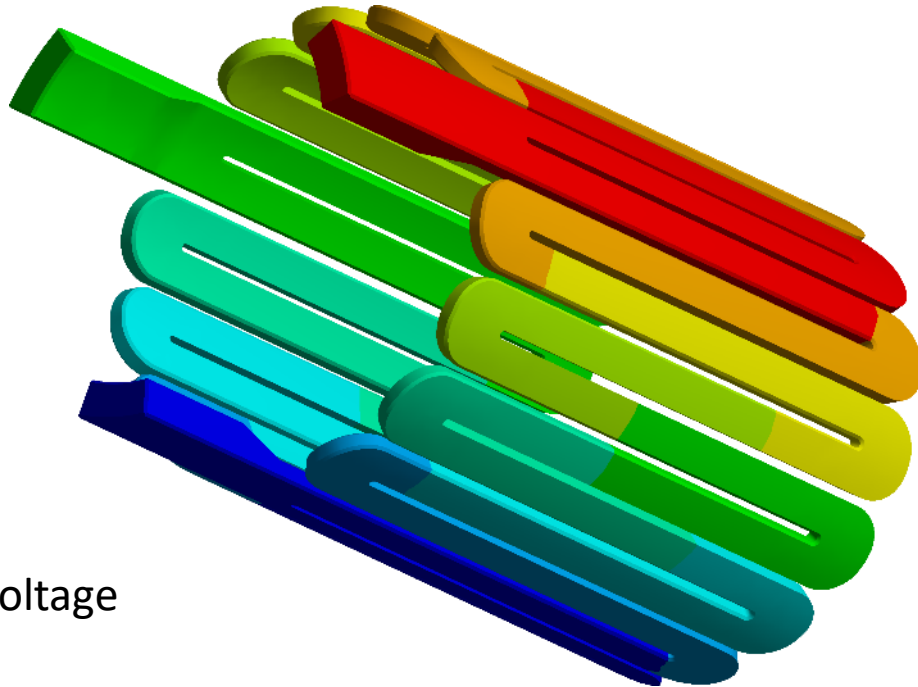
- Thermo-mechanical analysis of high-temperature equipment, e.g. furnaces in ceramics industry
- Optimization of graphitization curves (LWG and Acheson)
- Design of extrusion dies (including characterization of green mass)
- Support of material development, e.g. to increase thermal shock resistance
- Adaptation of firing curves to various product diameters
- Process optimization (reduction of setup times, routing optimization, warehouse management, ...)
- Customer support (design of furnace isolation, gas flow simulation, failure analysis,...)

- Modelling and simulation as full service provider
- External support for internal simulation resources (work on specialized tasks, handling of peak load, consulting for internal resources,...)
- Consulting during setup of simulation forces (required resources: skills, hardware, and software; training,...)

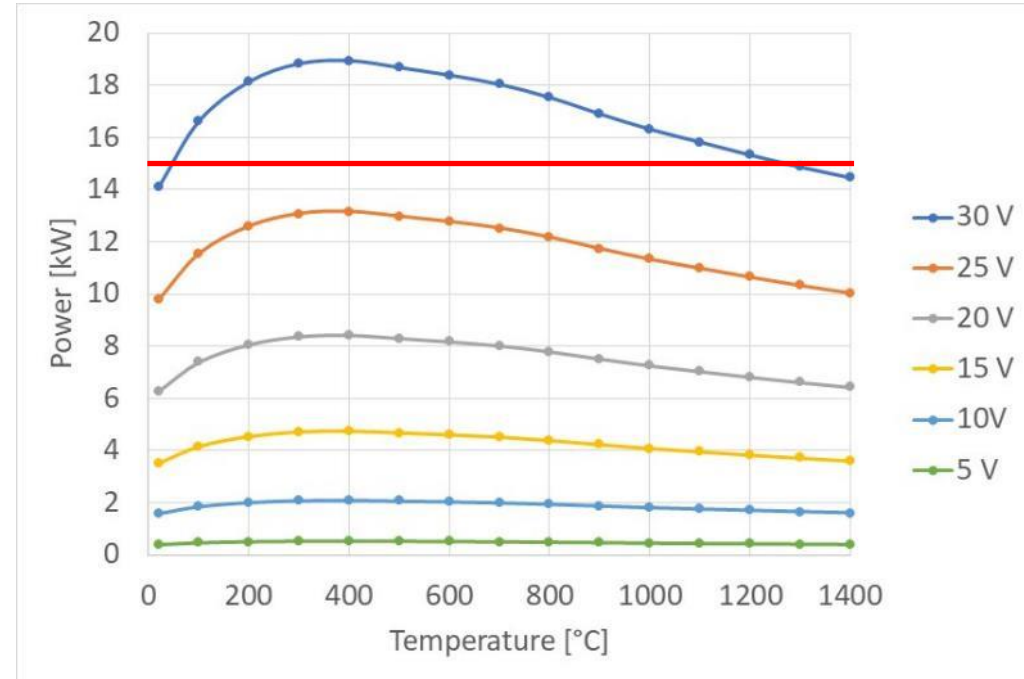
Heater and Isolation Design for an Industrial Welding Furnace

VM&P

Virtual Materials & Processes GmbH



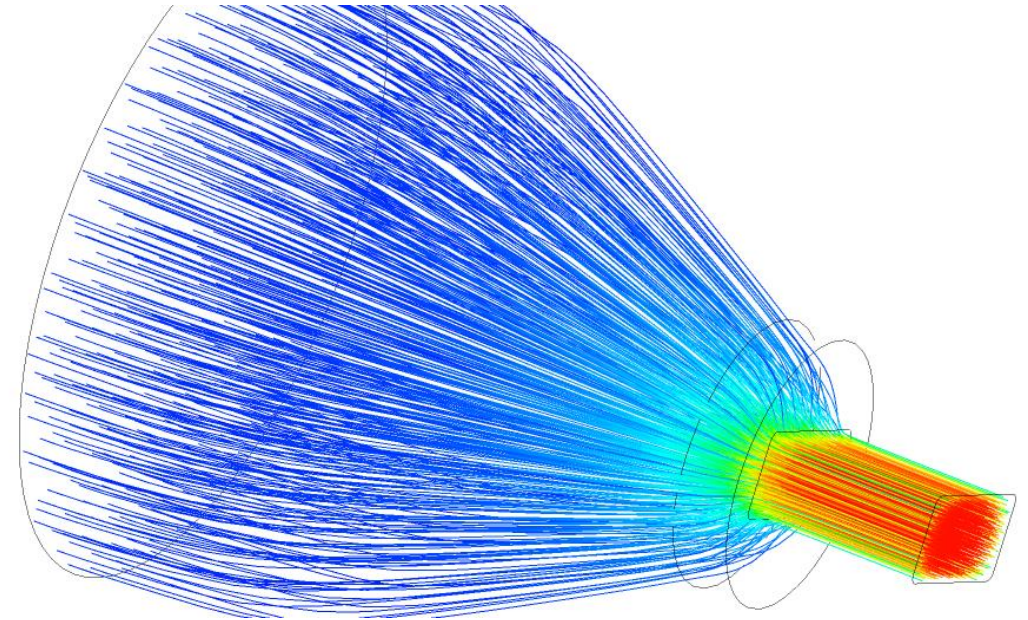
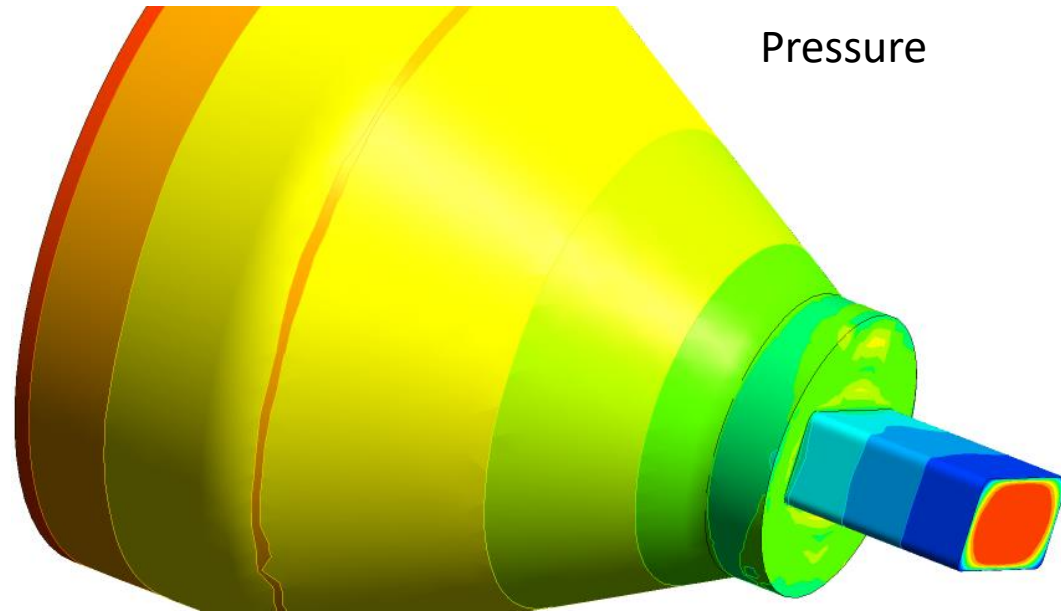
voltage



Our service

- Selection of heater geometry and material
- Layout of electrical power supply
- Optimization of heater geometry (reduction of thermal stresses, avoidance of hot spots)

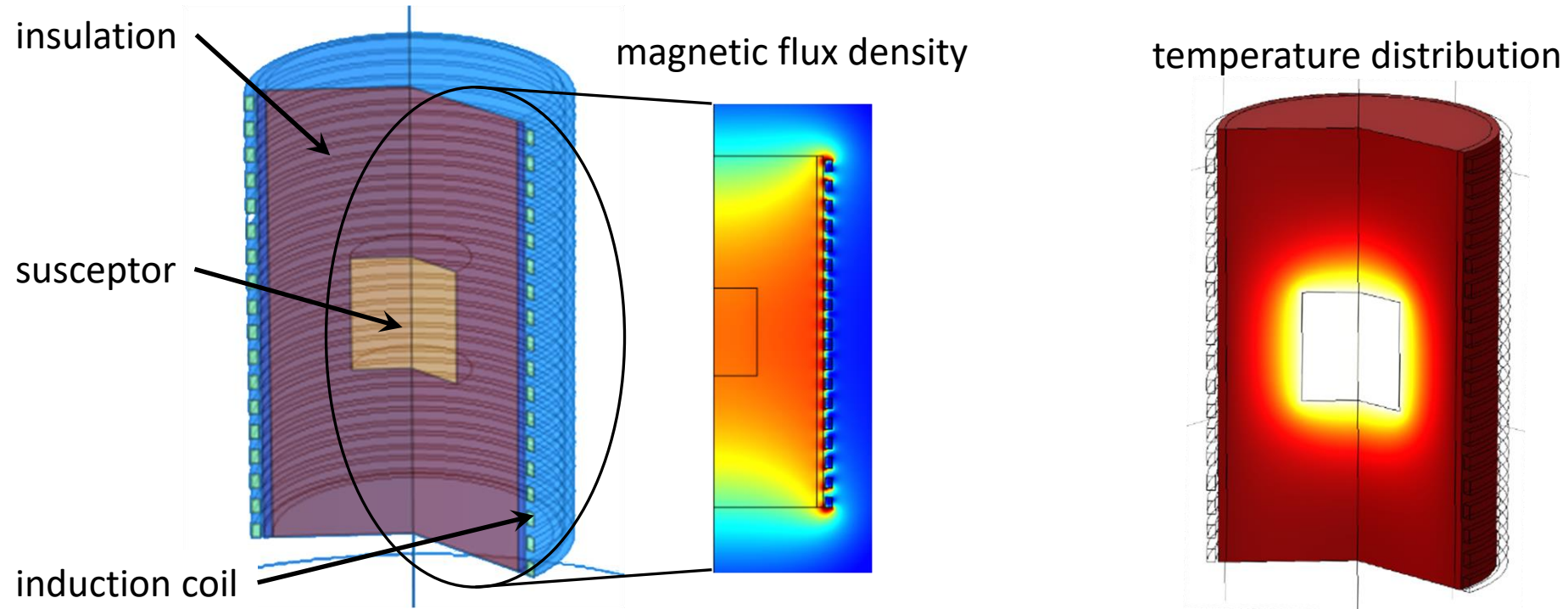
Extrusion Process Optimization



Our service

- Flow simulation
- Throughput and pressure loss calculation
- Design optimization of extrusion dies

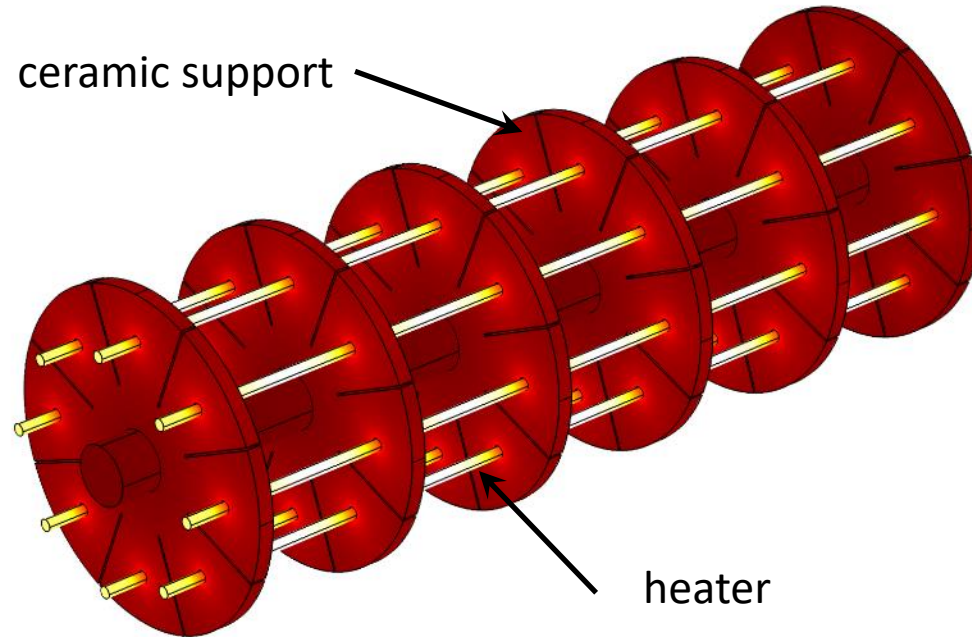
Design of a High Temperature Induction Furnace



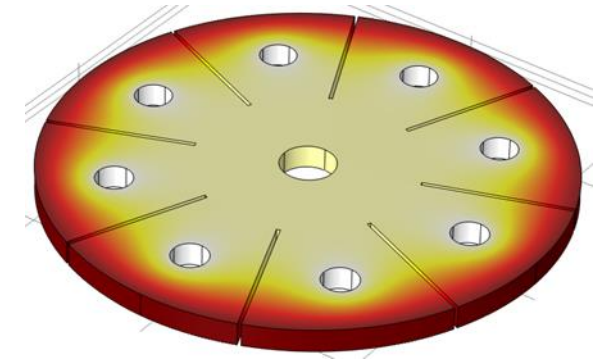
Our service

- Design of induction coil and furnace dimensions to guarantee the desired maximum furnace temperature and usable furnace volume
- Selection of susceptor and isolation material suitable for the selected induction frequency

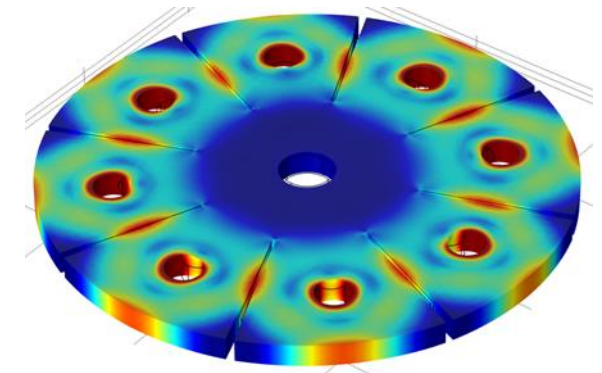
Ceramic Support for an Electric Heater



temperature



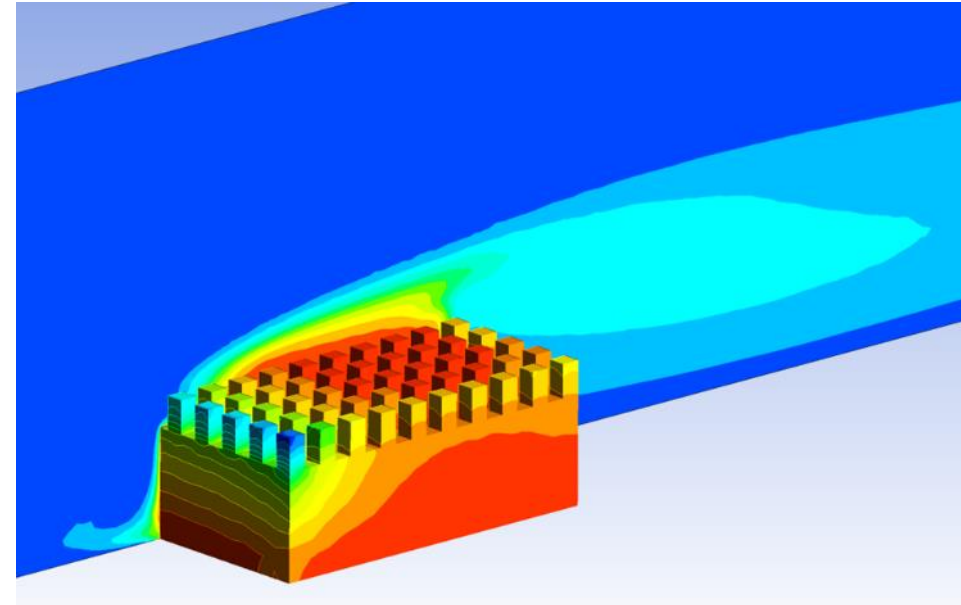
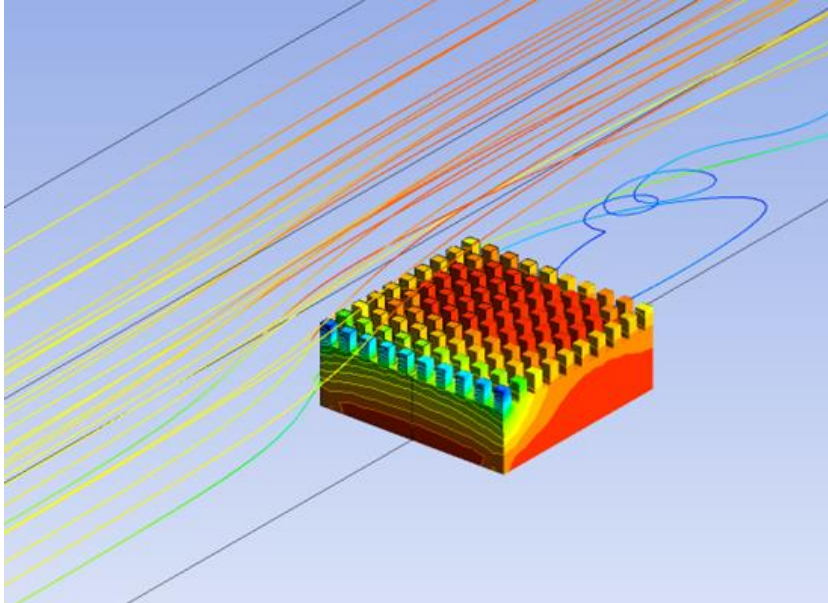
mechanical stress



Our service

- Calculation of temperature distribution
- Simulation of thermo-mechanical stresses (stationary & transient)
- Design optimization with respect to thermal stress resistance and strength

flow rate



temperature

Our service

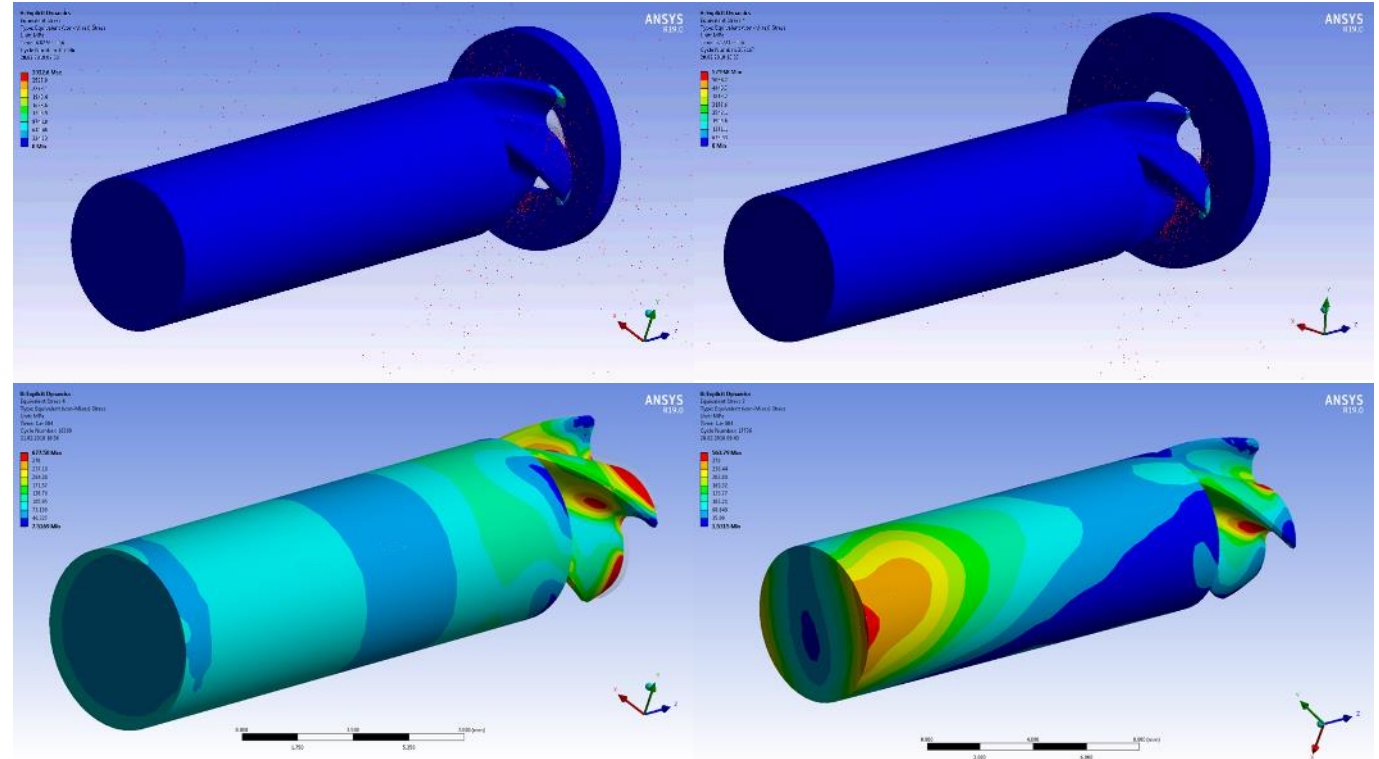
- Simulation of flow rate and pressure drop
- Calculation of cooling power
- Simulation of temperature distribution in cooler surrounding

Our service

- Simulation of tool material interaction including material erosion
- Determination of mechanical stresses in tool and material as well as tool design with respect to material and geometry

centric milling cutter

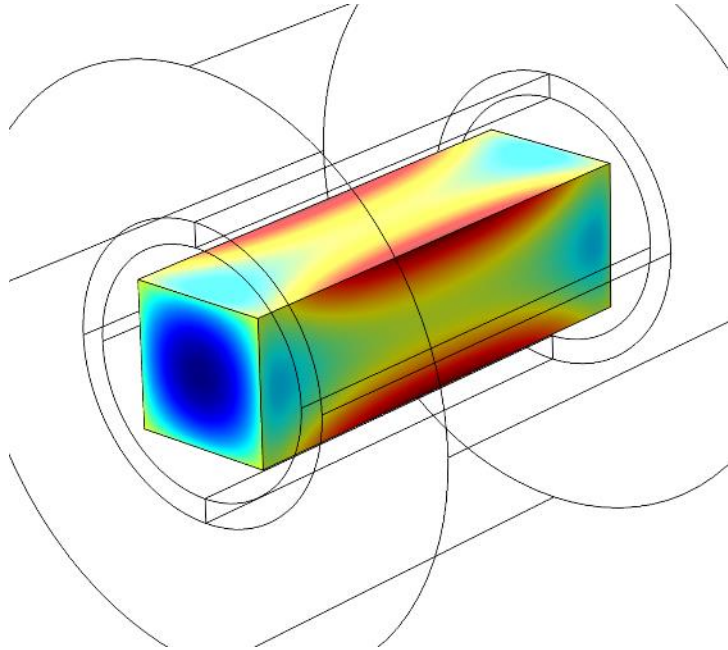
excentric milling cutter



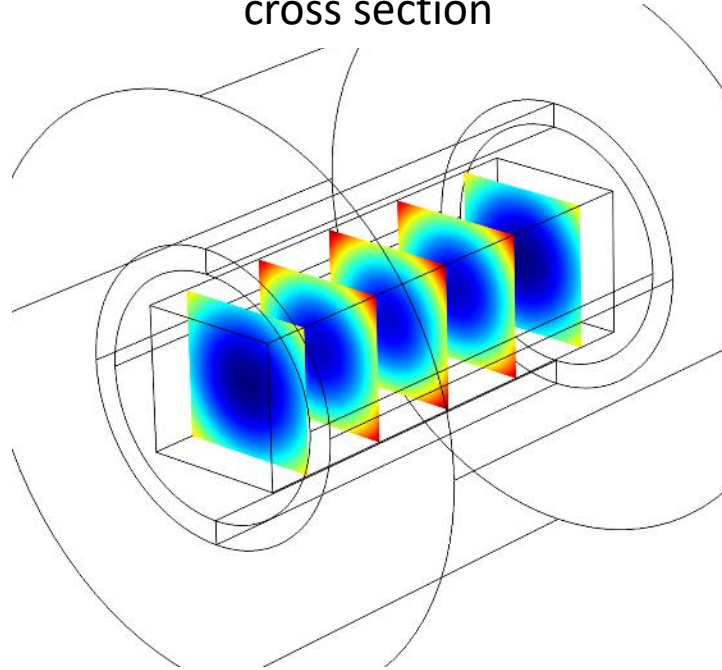
stress distribution

Inductive Heating

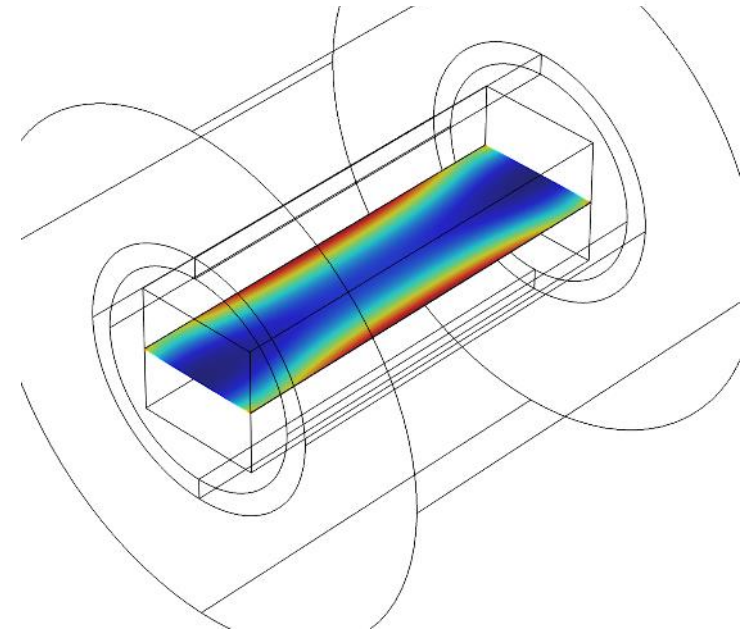
surface temperature



temperature distribution
cross section

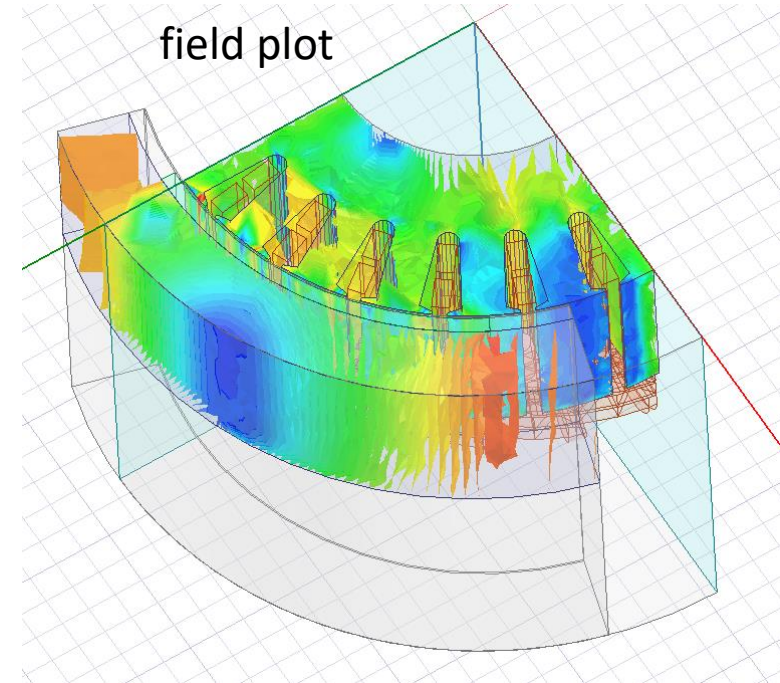
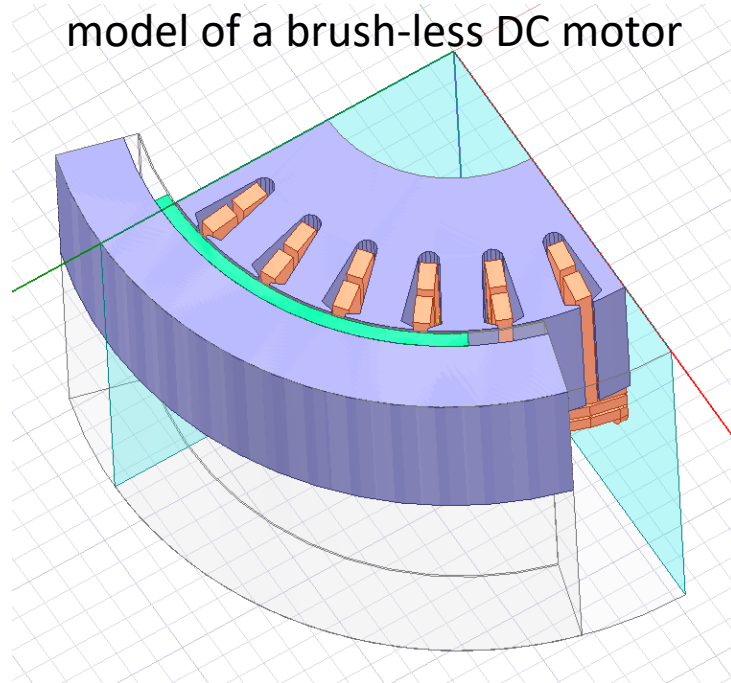


temperature distribution
longitudinal section



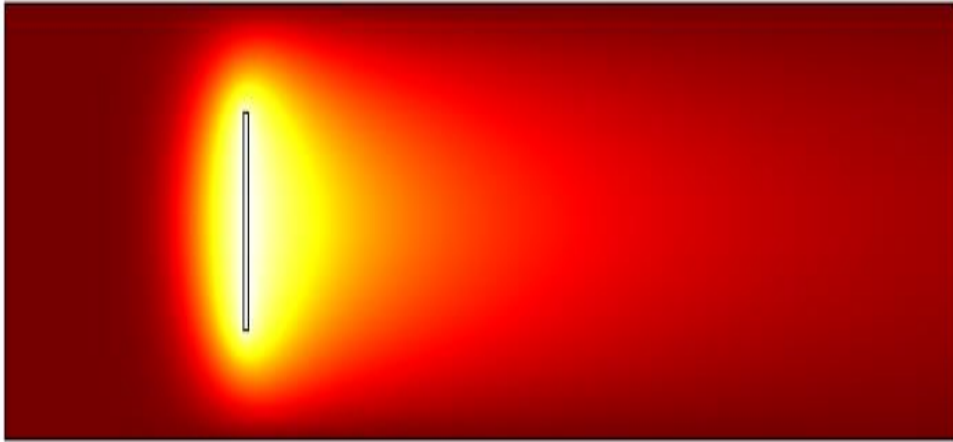
Our service

- Calculation of current and temperature distribution (stationary & transient)
- Adjustment of induction frequency to material for heating optimization

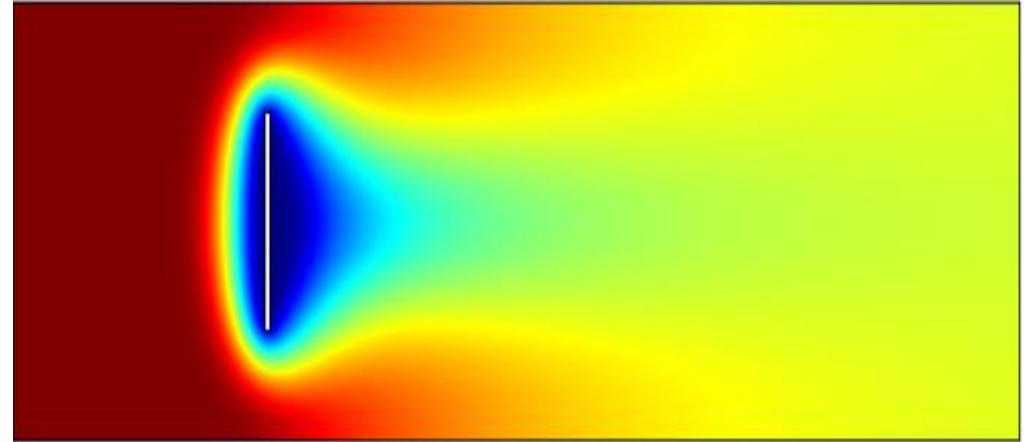


Our service

- Simulation of electric and magnetic circuits
- Design optimization of electric machines
- Material selection



temperature



species concentration

Our service

- In detail plasma simulation (fluid dynamics, heat & mass transport, electromagnetics)
- Determination of plasma and coating parameters
- Optimization of surface coating processes based temperature and species concentration

About Us

CV Dr. Martin Christ

CEO VM&P GmbH (since October 2017):

Technical consultancy; Head of German Ceramics Society (DKG) simulation subcommittee (May 2019), lessons on Systems Engineering at university of applied sciences Augsburg (October 2019)

Head of Focus Projects CI, SGL Carbon GmbH (April 2017 – September 2017):

Global responsibility for R&D projects on graphite for Li ion batteries, C-fibers, C/SiC ceramics, modelling & simulation

Head of T&I GMS, SGL Carbon GmbH (July 2015 – March 2017):

Global responsibility for R&D projects on Li ion batteries graphite, fine grain graphite, CFRC, felt, modelling & simulation

Head of T&I Graphites, SGL Carbon GmbH (April 2014 – June 2015):

Global responsibility for R&D projects on graphite & carbon electrodes, cathodes, furnace linings, modelling & simulation

Senior Manager Projects Coarse Grain Graphite & Modelling, SGL Carbon GmbH (January 2009 – March 2014):

Global responsibility for R&D projects on graphite & carbon electrodes, modelling & simulation

Senior Manager Projects T&I Expanded Graphite, SGL Carbon GmbH (April 2005 – December 2008):

Global responsibility for R&D projects on expanded graphite and graphite foil

R&D Manager Expanded Graphite, SGL Technologies GmbH (November 2002 – March 2005):

Responsible for R&D projects on expanded graphite and graphite foil within the business unit

Development Engineer, SGL Brakes GmbH (January 2001 – October 2002):

Material and process development for ceramic brake disks (C/SiC)

