MME® Engineering

Computer Aided Engineering

Metals. Minerals. Environment.

MME Engineering follows the philosophy of the Austrian Association of Consulting Engineers.

MME Engineering is committed to execute projects in a transparent way with the aim to supply the client with essential information focused on the given technological problem.

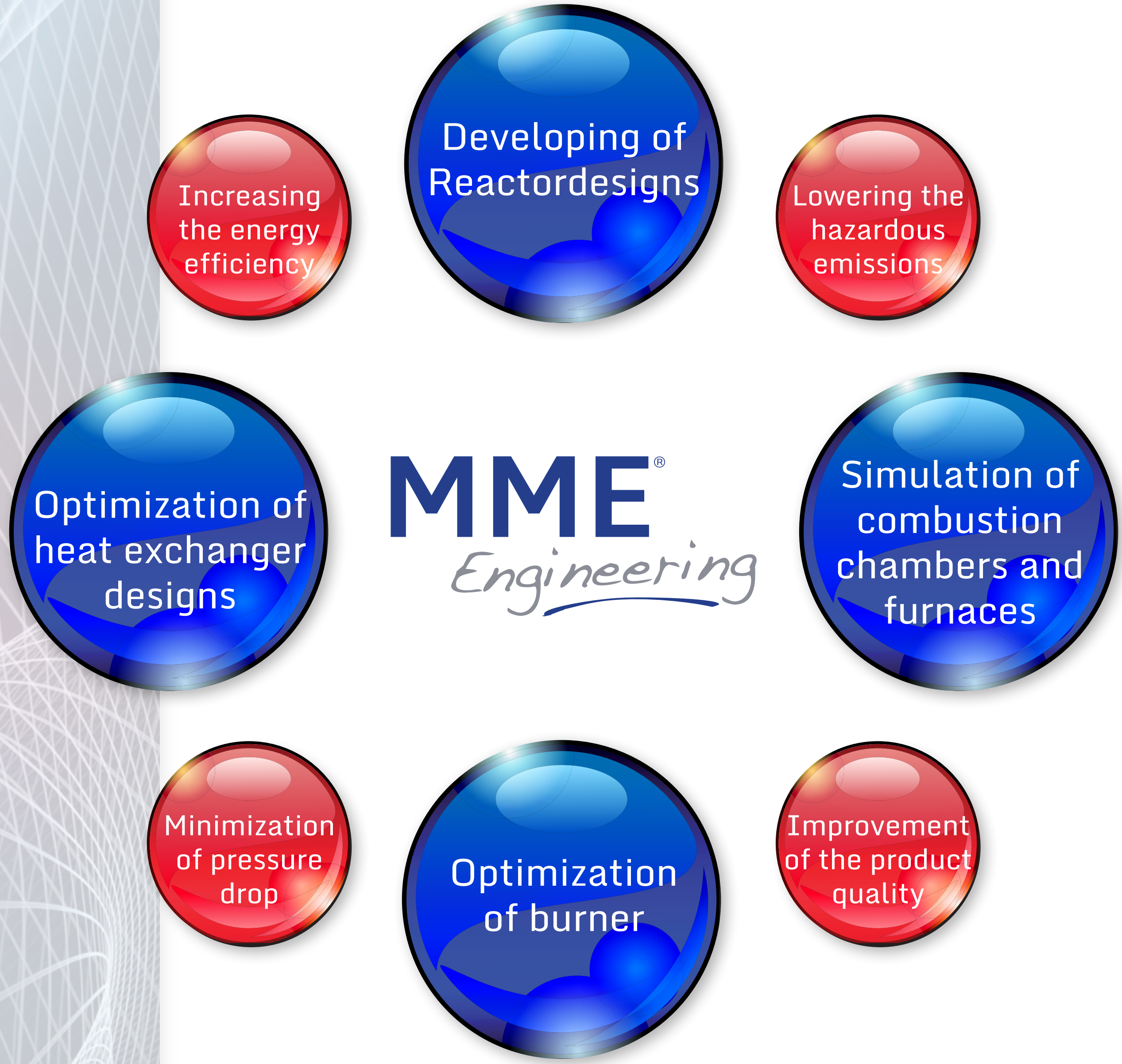
All involved engineers of MME Engineering are obliged to secrecy, not only throughout but also after finishing the project.

The intention of all involved technicians is to apply all their technological creativity and professional experience with the objective to solve technical problems effectively.

MME Engineering guarantees the use of state-of-the-art analytical technology. Highly qualified technicians at MME and the cooperating institutes ensure professional research and development work.

MME Engineering follows the guideline „keep it simple and effective“. Nevertheless, new technologies disclose new opportunities. MME always keeps up to date with the latest innovations of novel technologies.

Metals. Minerals. Environment.



Turbulence phenomena

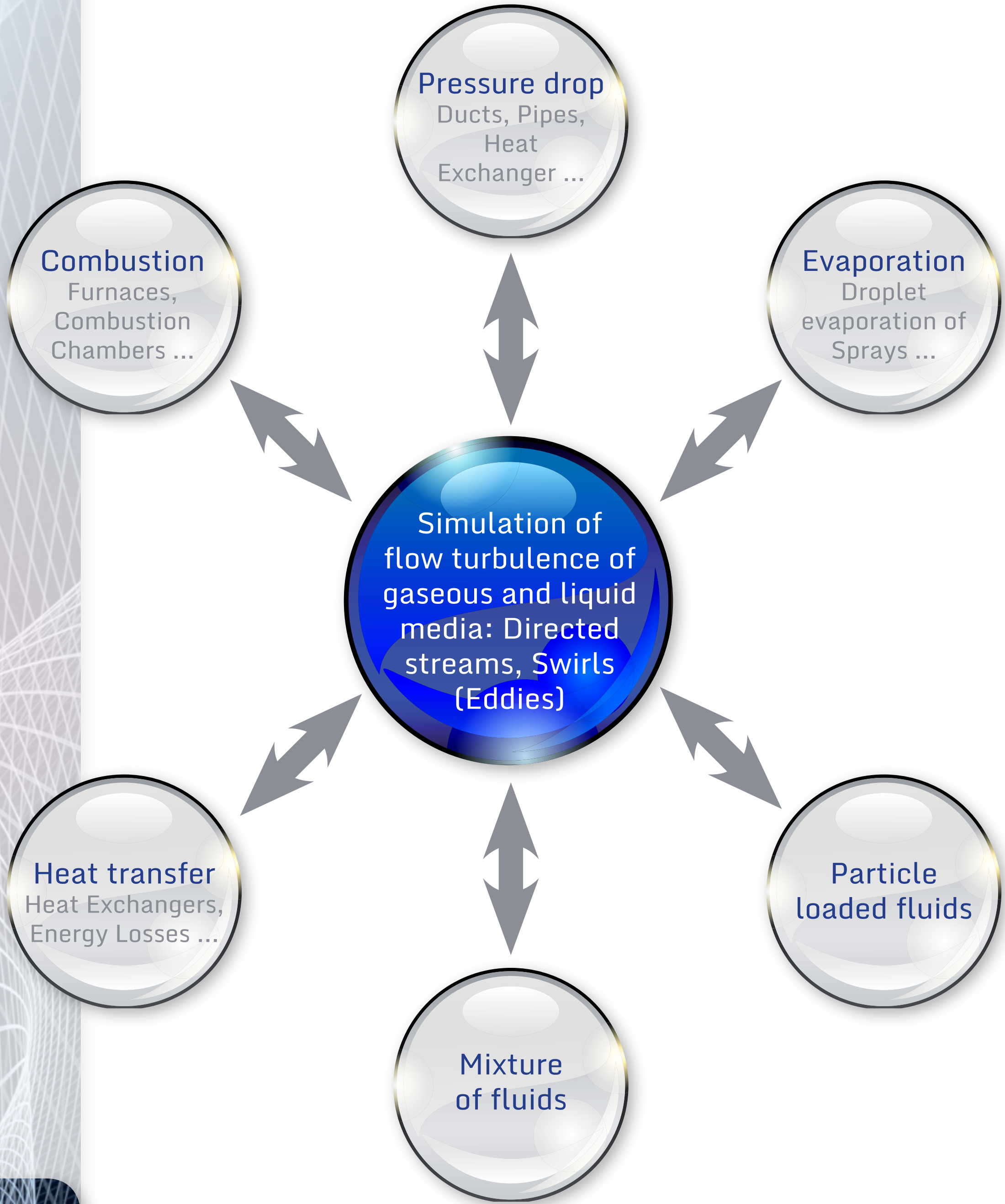
Simulation of turbulence phenomena at industrial applications

Examples

- guide vane optimization
- species distributions at neuralgic points
- temperature distribution over cross sections
- optimal heat transfer for heat exchanger systems
- heat transfer considerations at furnaces, converters etc.

- pressure drop determination
- reactor design
- research and development
- simulation of flow turbulence in climate chambers etc.

Turbulence phenomena



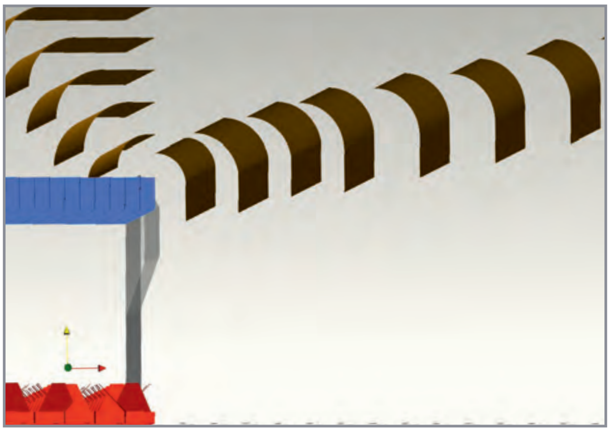
Computitional Fluid Dynamics

Numerical flow simulation has become an effective tool for designing equipment components in the field of process engineering. By three dimensional discretization of the Navier-Stokes equation, the continuity equation, the energy equation and additional terms (species balances, reactions, external forces, multiphase flow interactions) it is possible to obtain local information about the flow field. With the CFD-Technology following questions can be answered in a relatively cheap way:

- How does a geometry change effect the process performance
- What is the effect of different process conditions
- Which technical parameter shows the related chemical reactor

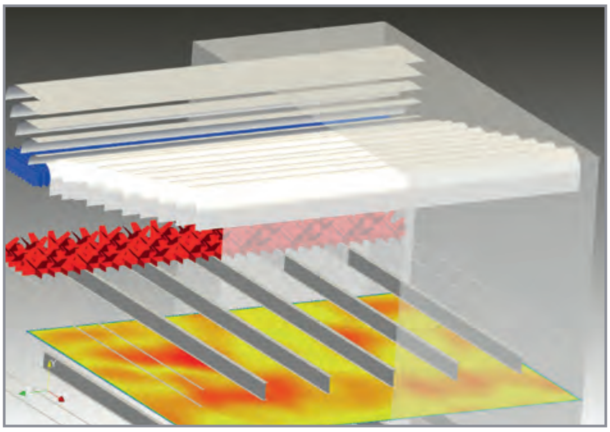
Time consuming and expensive mistakes in the engineering process can be avoided by performing CFD-studies. MME Engineering is well experienced in the field of CFD-engineering for several years. In the past the CFD-studies were not only done as “isolated” studies. Due to the long term activity as process engineer in the industrial section also the connection between the virtual and the real “process world” is given. MME Engineering possesses about high performance computer clusters. Therefore, CFD-studies can be performed in a quite fast and effective way.

Computitional Fluid Dynamics

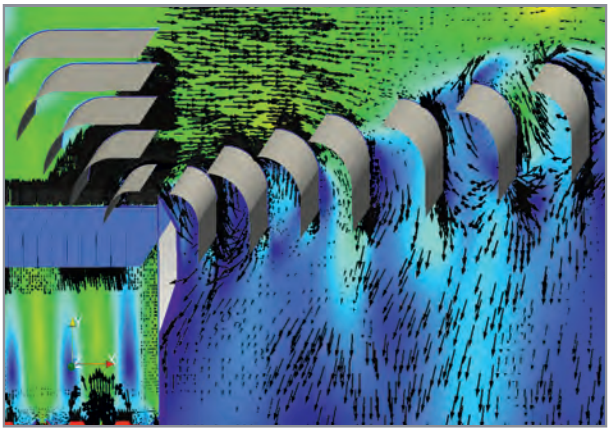


Example 1:
Optimzation of plant components

Designing guide vanes in flue gas ducts.



Calculation of the temperature and NH_3 distribution at the SCR-catalyst.



Calculation of the flow turbulence in flue gas ducts.

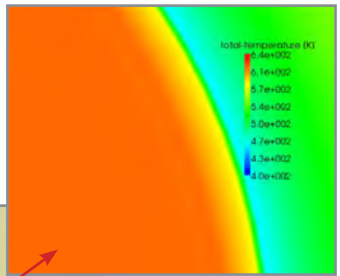
Computitional Fluid Dynamics

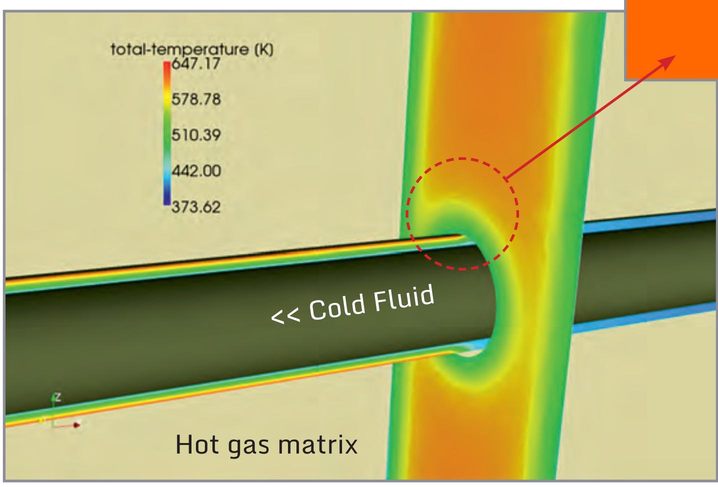
Example 2: Simulation of heat transfer

For investigation of possible corrosion effects by acid attack the temperature distribution at the inner wall in the near of heat exchanger tubes was calculated. Due to the cold fluid entering the system the inner side of the reactor shows locally temperature fields, which causes acid condensation. This effect is followed by corrosion of the material.

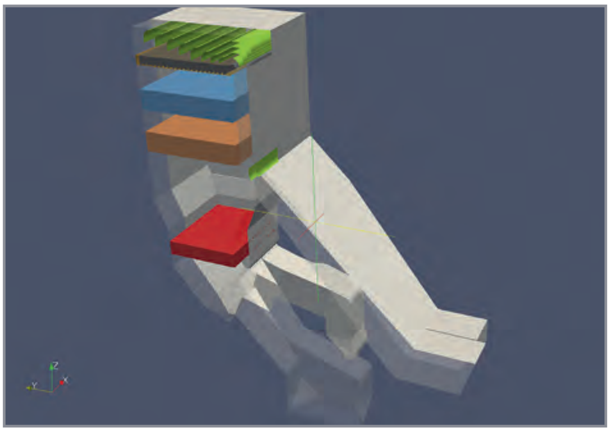
- Optimizing of heat exchanger
- Determination of thermal conduction
- Simulation of cooling effects

Temperature distribution at wall breakthrough for the heat exchanger tubes



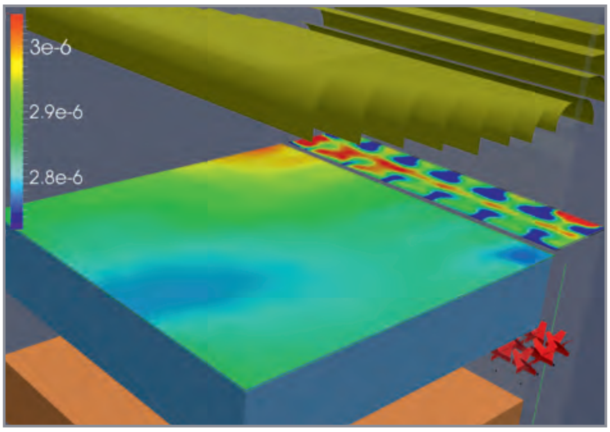


Computitional Fluid Dynamics



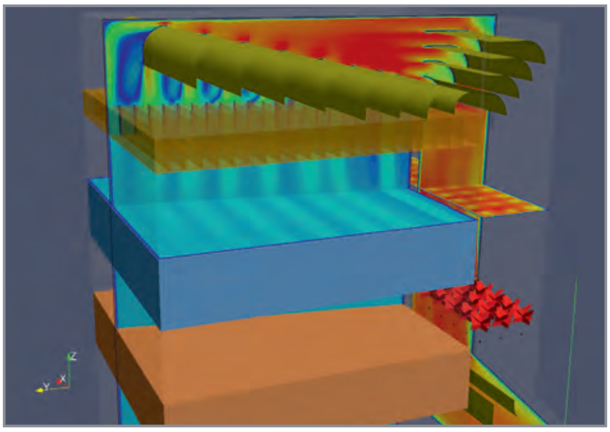
Example 3: Optimzation of plant components

Simulation of complete industrial reactors



Species distribution

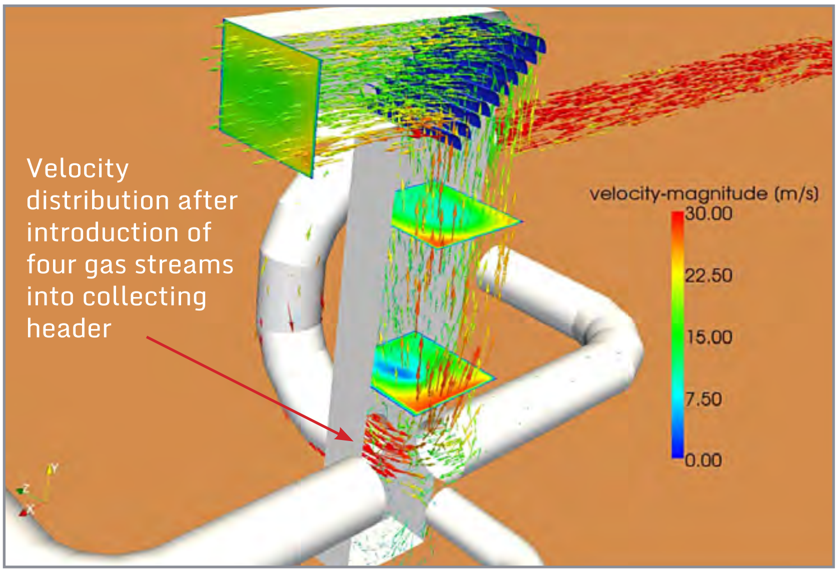
- Optimization of existing plants
- Developing of reactor designs
- Identification of dust collecting areas (multiphase simulation)
- Simulation in combination with heat transfer etc.

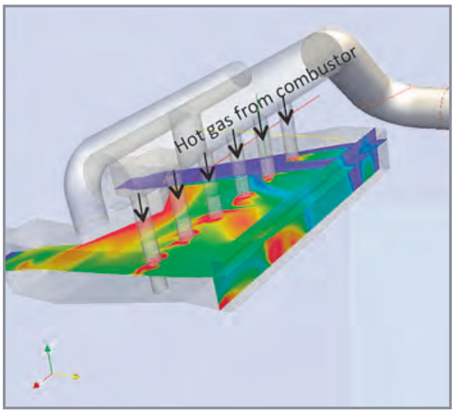


Velocity distribution

Computitional Fluid Dynamics

Example 4: Optimizing of flue gas ducts



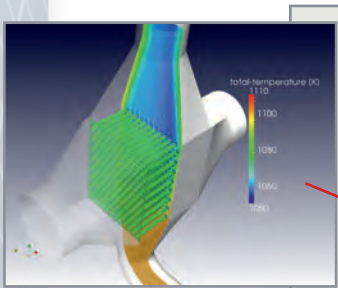


Temperature distribution after hot gas injection into a flue gas stream

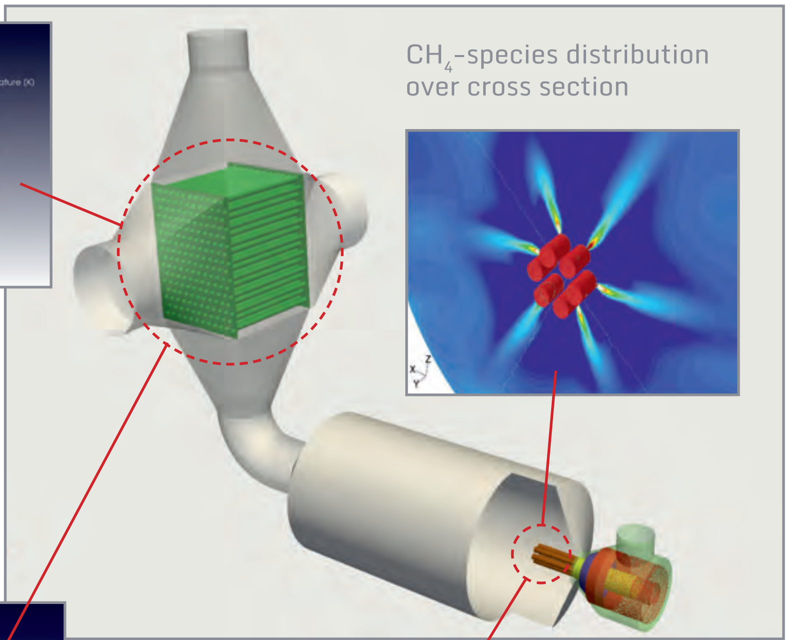
- Decreasing pressure drop values
- Designing of optimal reactor geometries
- Determination and adjustment of temperature and velocity distributions

Computitional Fluid Dynamics

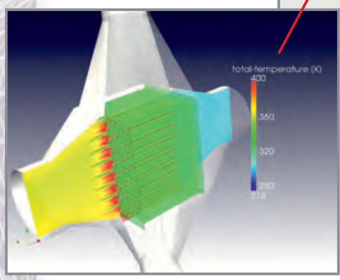
Example 5: Simulation of Combustion

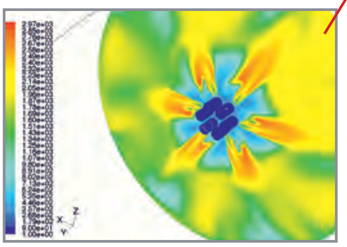


Heat-Transfer considerations (Temperature distribution over cross section)



CH_4-species distribution over cross section



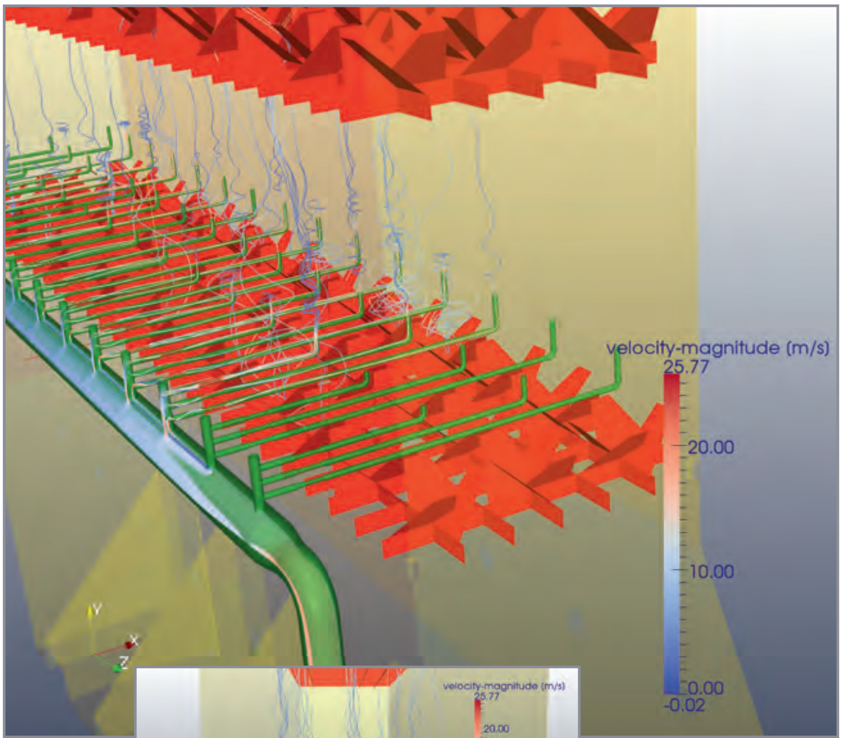


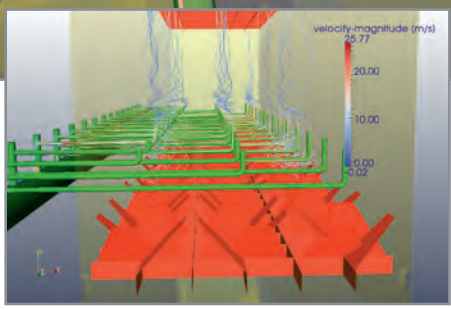
Temperaturplot over cross section at burner nozzles

- Optimizing of burner design
- Determination of temperature profile in a combustion chamber
- Heat transfer considerations

Computitional Fluid Dynamics

Example 6: Simulation of reacting agent injection

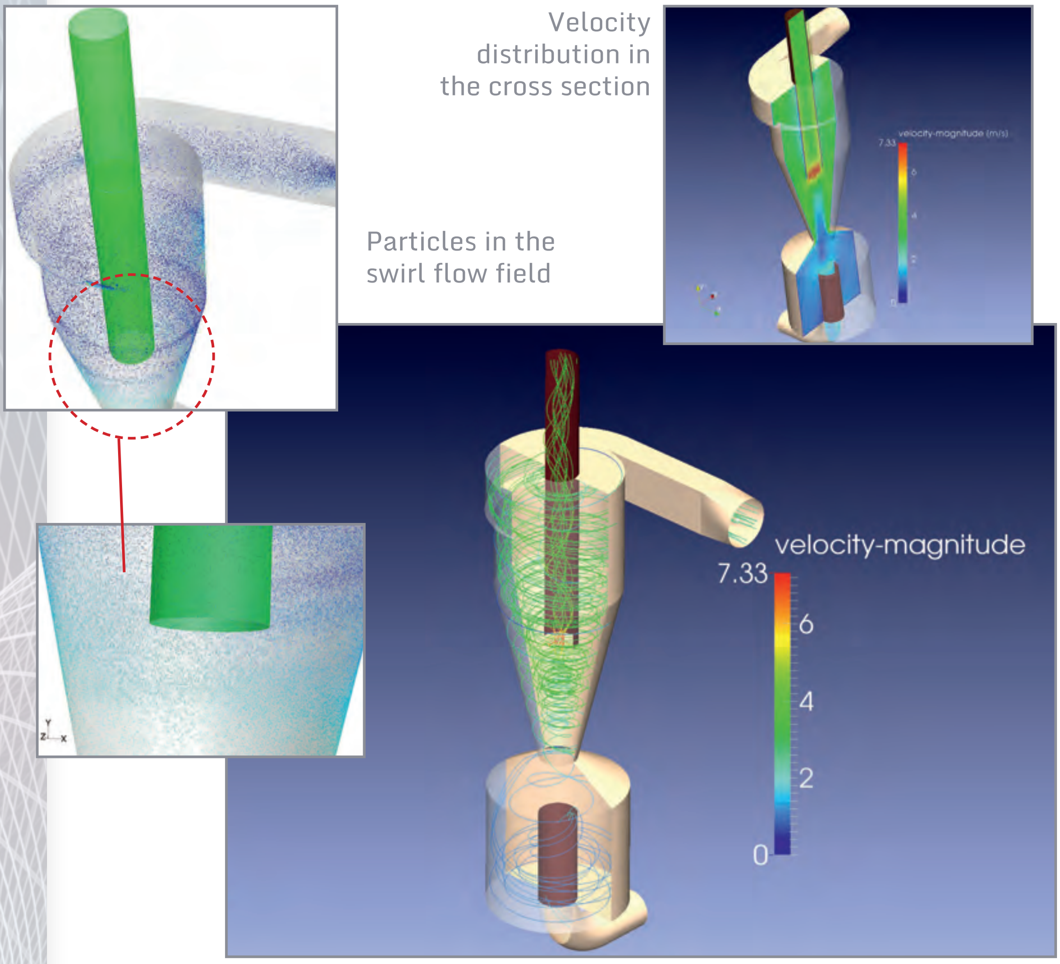




- Simulation of the mixing performance
- Determination of species distribution as a function of fluid turbulence and mixing length
- Testing of different static mixers

Computitional Fluid Dynamics

Example 7: Simulation of Cyclones



Velocity distribution in the cross section

Particles in the swirl flow field

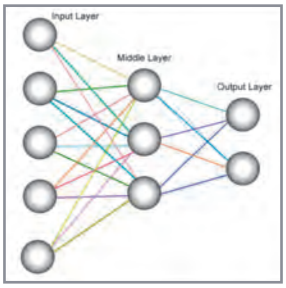
- Calculation the efficiency of particle separation cyclones
- Simulation of hydrocyclones
- Determination of the particle size distribution at the cyclone outflows

Neural Network

The Neural Network is a sort of Artificial Intelligence. The principle of how the brain is working is applied to neural network software tools. With this tool it is possible to create self-learning systems. In the given example the input information could be data out of chemical experiments, process control systems, analytical databases, etc. It is possible to handle huge amounts of data and to find out the most important correlations between input and output data. Thus, the most important parameter for steering technical processes can be identified and process optimization can be performed.

Input → **Neural Network** → **Output**

Input: Data for self learning system (Process- and Product Quality Data): Temperature, Crystal size, Mass Flow, Pressure, pH-Value, etc.



Output: Tailormade NN-Model for identification of the most important correlations and forecasting within the investigated system

- Process analysis based on tracked data out of the process control system
- Forecast and optimization of chemical processes on basis of tailormade neural network models

MME Engineering

Qualification

Dr. Roman Schiesser | Chemical Engineer

As a member of the Austrian Association of Consulting Engineers represented by

ACA

Industrial background

- Process development for recovery of tungsten and Cobalt out of related secondary raw materials
- Process development of novel combustion processes for NO_x reduction with simultaneously improving the energy efficiency
- Process engineering in the field of environmental technology
- Research and development director for designing hydrometallurgical processes

Within his perennial professional career, Dr. Roman Schiesser was significantly involved in challenging technology development projects. Throughout more than ten years experience in chemical process technology he obtained deep understanding for various types of chemical processes. In his past he had the opportunity to work for mining, petrochemical as well as for refractory companies.

Former Employers

SIEMENS AG | RHI Refractories
STRABAG Flue Gas Treatment | SMS Siemag

Certificates

Selected References

Customer	Project	Problem considerations
STRABAG Energy Technologies GmbH	Waste incineration plant Spittelau (parts 1-3)	Guide vanes design; Optimization of upstream flow of heat exchanger; Heat transfer considerations; Pressure drop optimization
STRABAG Energy Technologies GmbH	Research and Development for a new Heat-Exchanger-Design	Heat Transfer calculation
STRABAG Energy Technologies GmbH	Engineering of an ammonia injection grid for a SCR-reactor in a heat recovery boiler	NH_3-Distribution at SCR-Inlet after AIG (Ammonia Injection Grid)
Combustion Solution GmbH	Antipinski	Simulation of a new burner design
Gas Connect Austria GmbH	National Gas Pipeline Grid	Simulating the gas pipeline grid in Austria
RHI AG	Shaft Kiln plant Trieben	Optimization of high temperature shaft kiln
Wolfram Bergbau und Hütten AG	Rotary Kiln plant St. Martin	Optimization for tungsten oxidation
References as employee		
VOEST Linz	Steelplant	Optimzation of a SCR-Reactor
OMV	HKW1 | HKW2	CFD-Simulation and optimization
Optimization of diverse smaller SCR plants for asian, dutch and american customer		

MME® Engineering

Contact
MME Engineering e.U.
Dr. Roman Schiesser
Nussdorfer Strasse 55/19, 1090 Vienna | AUSTRIA
roman.schiesser@mme-engineering.at
www.mme-engineering.at
+43 (0)1 9580851 | +43 (0)699 11096912