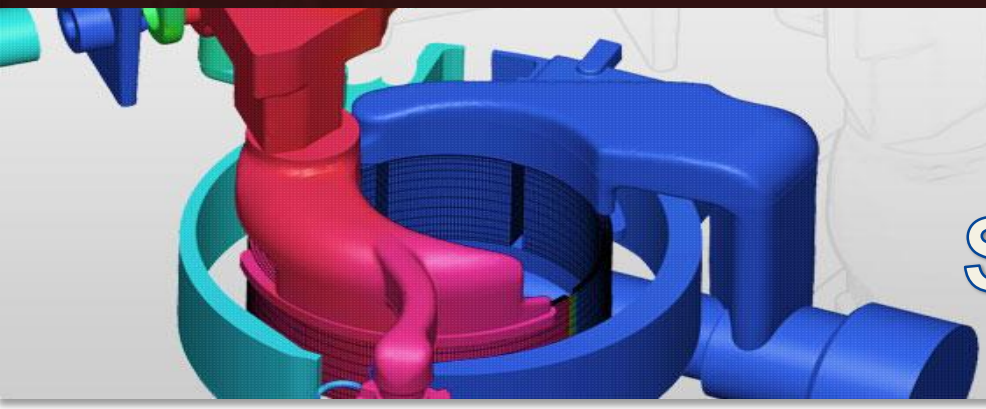
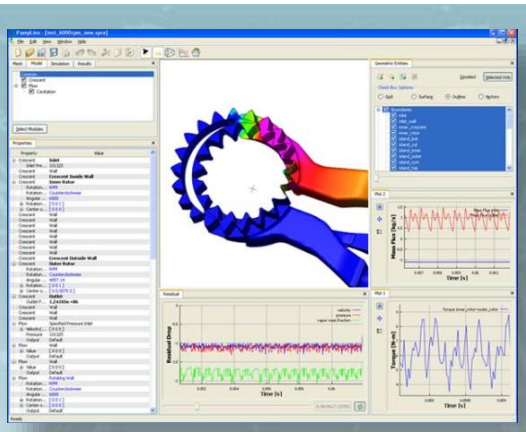
Flow Simulation Software Created Specifically for
Pumps, Valves, Turbines, Compressors, and Integrated Fluid Systems

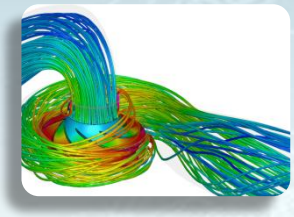


Simerics
TECHNOLOGY BY DESIGN

Simerics-MP+®

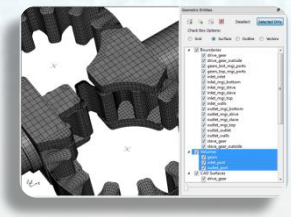
Simerics-MP+® is a 3-D, multiphase **Computational Fluid Dynamics (CFD)** tool that provides accurate virtual testing for the analysis and performance prediction of **pumps, motors, compressors, valves, turbines,** and **integrated fluid systems**.
For liquid systems, the proprietary **Simerics-MP+® Cavitation/Aeration Module** accurately models vapor, free and/or dissolved gas and liquid compressibility to enable the best available analysis of performance, pressure ripple, and cavitation damage.





Fast model creation, even faster simulation speed

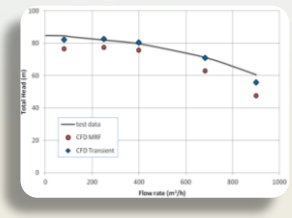
- Less than an hour from CAD to Simulation
- Automated mesh generation
- < 15 minutes for steady-state results
- Transient results 10-30X faster than other CFD



Comprehensive physics & robust solver

- Flow, Turbulence, Conjugate Heat Transfer, Aeration, Cavitation, Particles
- Converges difficult problems (e.g. severe cavitation, micro-scale features)

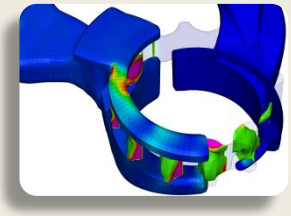
Accurate predictions



- Excellent correlation with test data over the full operating range
- Typically within 5% of hardware tests

Models complex details down to the micro scale

- Accurately model leakage gaps, tip clearances, balance holes, etc.



Superior Cavitation / Aeration Module

- Rigorously accounts for formation, transport and effects
- Non-condensable gases (e.g. air) and vapor
- Consistently provides accurate results where others fail

Contact us for a Demo!

*"Simerics-MP+ Helps Raise **Productivity** and Improve **Quality** of Simulation Work"*

- Raffaele Squarcini, Calculation & Simulation Department Manager
Pierburg Pump Technology

Key Advantages of Simerics-MP+ Templates

Simerics-MP+ Templates

Simerics-MP+® Templates are the quickest and easiest way to model the transient effects of fluid systems such as pumps, motors, valves and compressors.

Intelligent Wizard

Each template is purpose built for its particular fluid system application. The template's built-in logic reduces user input and helps prevent mistakes to ensure quick and easy model setup.

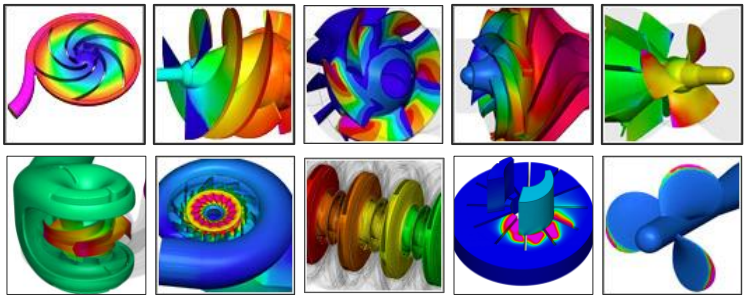
Proprietary Meshing

The mesh is the most critical component for fluid flow simulations. Simerics-MP+ Templates produces an optimized mesh that is able to capture the specific physics and dynamic movement of each application.

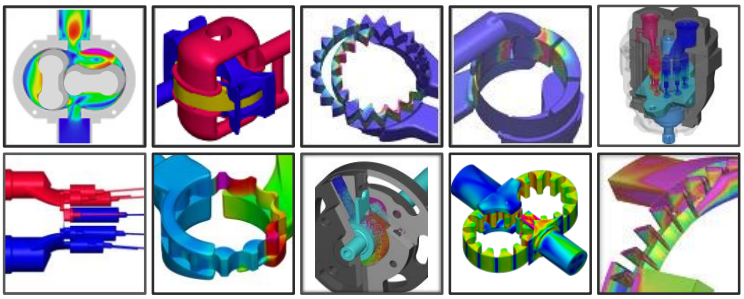
Model Specific Results

Simerics-MP+ Templates save engineers by providing relevant engineering output that is specific to the application. All of the data produced in a physical test is available within Simerics-MP+ with the addition of valuable design insight through visualizations.

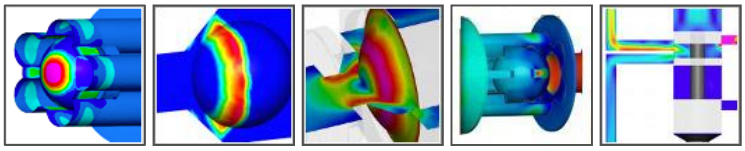
Axial / Centrifugal Applications



Positive Displacement Machines



Valves



+1 425-502-9978 | bw@simerics.com | www.simerics.com

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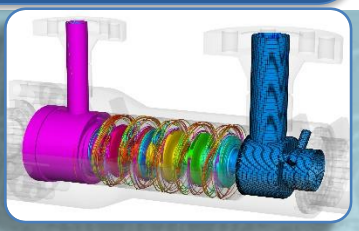
1750 112th Ave NE | Suite C250 | Bellevue, WA 98004

Typical Papers on Pump Applications

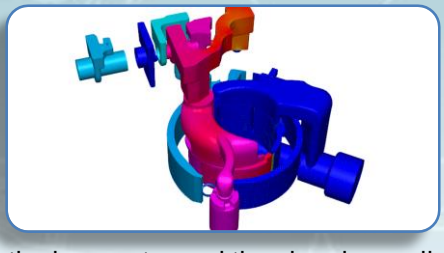
For more details, please contact bw@simerics.com



Proceedings of the ASME 2017 Fluids Engineering Division Summer Meeting
CFD SIMULATION OF A MULTI-STAGE CENTRIFUGAL PUMP

ABSTRACT

In this paper, a CFD software package is applied to the performance prediction of a 14-stage centrifugal pump with opposed impeller configuration. In this study, the fluid volumes of the complete multistage pump are simulated together. The CFD model includes not only all the main flow channels from inlet to discharge, but also all the secondary flow passages such as wearing ring leakage and seal flush. The CFD model and the simulation results will be presented and discussed in detail. The CFD prediction will be compared with available experiment data.



SAE Paper 2012-01-0637
Numerical Modeling of Vane Oil Pump with Variable Displacement

ABSTRACT

The oil flow rate in an automotive vane pump varies by virtue of the eccentricity between the inner rotor and the chamber wall. The movement of the chamber wall is facilitated by a ring-spring assembly which is pivoted and moves depending on the balance of system oil pressure and the pre-tensioned spring. In this paper, the ODE of kinetics of the solid piece spring motion is dynamically coupled with CFD simulation of oil flow in a vane pump. A re-meshing step is taken at every time step based on the update of the fluid domain which is determined from the ring position. The algorithm is implemented in the general purpose CFD code PumpLinx and applied to an automotive vane oil pump. The simulation results of pump performance curve are compared with the measurement data, together with the ring positions comparison. A very good agreement is observed between the simulation results and measurement data. The work demonstrates the efficiency and effectiveness of the present approach as there is very little overhead of incorporating the dynamics of solid motion into the CFD model. The process of setting up the model from CAD geometry to CFD simulation will be discussed in detail.

Proceedings of the ASME/BATH 2015 Symposium on Fluid Power & Motion Control
CFD ANALYSIS OF GEROTOR LUBRICATING PUMPS AT HIGH SPEED: GEOMETRIC FEATURES INFLUENCING THE FILLING CAPABILITY

ABSTRACT

The paper presents an extensive analysis of the influence on the suction capacity of the main geometric parameters of gerotor lubricating pumps. The study was carried out using a CFD model developed with the commercial software PumpLinx®. The model of a reference gerotor unit was validated experimentally in terms of delivered flow rate in different operating conditions, in open and closed circuit configuration. In the former case different geometries of the inlet pipe were tested. In the latter the influence of the suction pressure at constant speed was analysed. After the model validation, several geometric features were changed to assess their influence on the volumetric efficiency in conditions of incomplete filling, such as the thickness and the diameter of the gears, the position of the inlet pipe with respect to the rotors (radial, axial and tangential), the shape of the port plate.

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