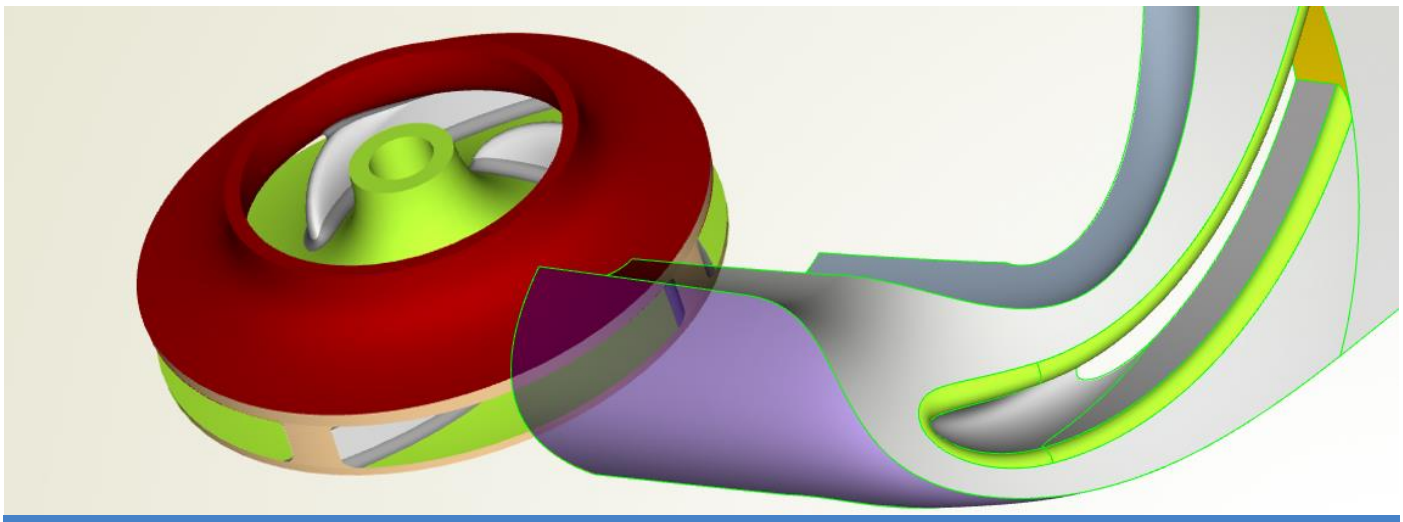


TECH BRIEF

PUMP DESIGN AND OPTIMIZATION WITH CAESES®

CAESES® is the most efficient solution in the market for fast and comprehensive pump design in the context of shape optimization with CFD (Computational Fluid Dynamics). CAESES® drastically speeds up the engineering process by automating geometry generation, to find optimal design candidates in the shortest time.

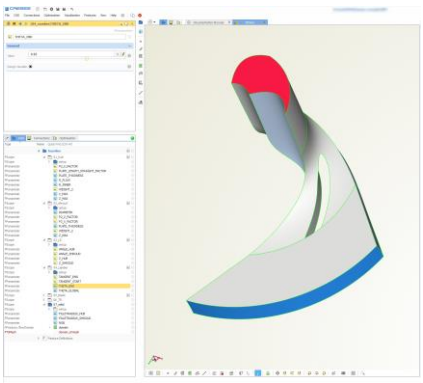
WHO USES CAESES®?

Leading companies worldwide – such as KSB, Ebara, Hitachi and DMW – have integrated CAESES® into their workflows for delivering high-quality, optimal pumps to their customers.

GEOMETRY FOR SHAPE OPTIMIZATION WITH CFD

What makes CAESES® different to other pump design tools in the market is its focus on robust variable geometry for CFD-driven design processes – with full customization possibilities and no black box models.

Import and start with a preliminary baseline design of a volute or an impeller, which can be used for fitting your custom CAESES® model. These models are 100% robust during variation, ready for fully automated analysis with your simulation tools. The parametric flow domains are available for the generated impeller geometries, to fully automate the meshing process. Predefined colors and indices make sure that all references are kept during design studies and optimization runs.

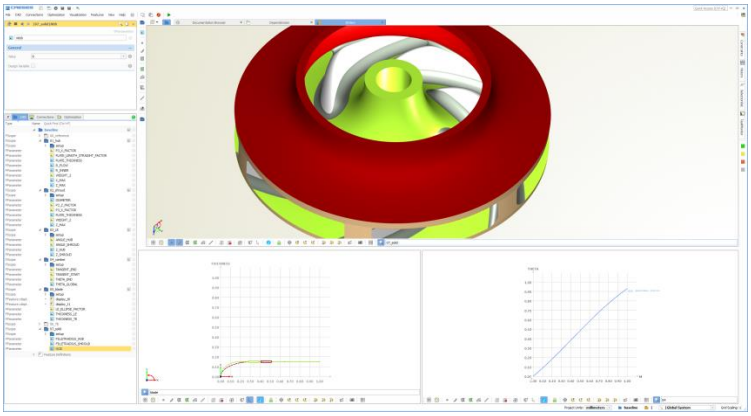


EFFICIENT PARAMETRICS

The actual geometry generation is most efficient in terms of the resulting shape changes. You can enter all your pump design expertise including all constraints into your parametric CAESES® model. This makes sure you generate only feasible and meaningful designs, with a smaller set of well-chosen parameters. As a result, you drastically accelerate your design process by saving unnecessary and expensive CFD computations.

FULL CUSTOMIZATION

CAESES® gives you a powerful CAD environment including scripting possibilities. This allows you to customize everything according to your individual company requirements (parametric hub/shroud contours, wrap angle & thickness functions, radii-based profile definitions, fitting processes and channel optimization etc.

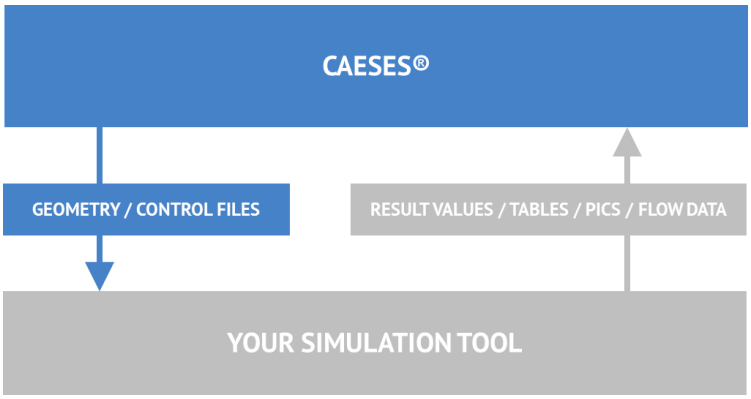


Customized, variable geometry model of a water pump for simulation-driven design

By using the feature definitions from CAESES®, you can even code your own preliminary design tools using mathematical formulas, functions and control statements (if-else conditions, loops, breaks, switches etc.).

AUTOMATION OF THE PUMP DESIGN PROCESS

Besides the comprehensive CAD functionality, CAESES® allows you to automate the design process by integrating your meshing and CFD tools. Typical tools that can be coupled are FINE™/Turbo, ANSYS CFX & TurboGrid, PumpLinx, STAR-CCM+, OpenFOAM, proprietary in-house tools.



With this and the integrated optimization methods you have everything available to conduct design studies and shape optimization. All in a single unified graphical user interface!

> ***"I have been successfully using CAESES for many years now. It allows me to create my own customized toolbox with everything I need in the different stages of the pump design process. The functionality of CAESES greatly accelerated and complemented our traditional design process. Finally, it lets us improve the quality of our various different types of pumps."***
>
> *— Dr. Toni Klemm, CFD Engineer, KSB SE & Co.*